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Recreational Benefits of
Delaware's Public Beaches:
Attitudes and Perceptions of
Beach Users and Residents
of the Mid-Atlantic Region

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**RECREATIONAL BENEFITS OF
DELAWARE'S PUBLIC BEACHES:**

**ATTITUDES AND PERCEPTIONS OF
BEACH USERS AND RESIDENTS
OF THE MID-ATLANTIC REGION**

CIRCULATING COPY

by

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A Report Prepared for:

**Delaware Department of Natural Resources and Environmental Control
Division of Soil and Water Conservation
and the
U.S. Army Corps of Engineers, Philadelphia District**

AUGUST 1994

**University of Delaware
Sea Grant College Program
Newark, DE 19716**

This publication is the result of research sponsored in part by NOAA Office of Sea Grant, Department of Commerce, under Grant No. NA16RG0162 (Project No. A/I-1) to the University of Delaware Sea Grant College Program. Funding has also been provided through a contractual agreement with the Delaware Department of Natural Resources and Environmental Control, Division of Soil and Water Conservation. The U.S. Government is authorized to produce and distribute reprints for governmental purposes, notwithstanding any copyright notation that may appear hereon.

The University of Delaware Sea Grant College Program is supported cooperatively by the National Oceanic and Atmospheric Administration, U.S. Department of Commerce, and by the State of Delaware.

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ACKNOWLEDGMENTS

The authors wish to thank the DNREC Division of Soil and Water Conservation for their support of this study. In addition to the required willingness-to-pay responses that were collected and analyzed, much useful attitudinal information and user data also were gathered. These supplemental data will be presented to local community officials so that they can more fully understand the characteristics of beach visitors and better respond to their needs.

We are grateful for the many helpful comments and suggestions provided by Ms. Christine McVey, economist with the U.S. Army Corps of Engineers, Philadelphia District, and Mr. Robert Henry, Program Administrator of the Shoreline and Waterway Management Section of the DNREC Division of Soil and Water Conservation. Without their support and assistance, this study and final report would not have been possible.

We also wish to thank Ms. April Beauchamp with the University of Delaware Sea Grant Marine Advisory Service for all of her contributions in typing the many draft copies and final version of our survey instruments, as well as this completion report. Ms. Pamela Donnelly, Ms. Tracey Bryant, and Mr. David Barczak of the University's Marine Communications Office deserve thanks for their communications support during various phases of the project.

Dr. George Parsons, associate professor of marine policy of the University's Graduate College of Marine Studies, provided invaluable advice as we became more familiar with the contingent valuation method of valuing natural resources like ocean beaches. His comments were always constructive and helpful. Thanks are also extended to Mr. John Confer for assistance in conducting data analysis and Ms. Eileen Lodermeier for assisting with data entry.

We are grateful to those randomly selected mail survey respondents from throughout the region who took the time to answer our questionnaire and return it. Their responses were vital to the success of the study. Finally, we wish to thank the 562 on-site beach users who took the time to talk with us during the summer of 1993 and provide their opinions about our valuable ocean beaches. Their feelings, reflected in this report, will have an impact on the course of action for managing Delaware's ocean beaches for years to come.

EXECUTIVE SUMMARY

This report, *Recreational Benefits of Delaware's Public Beaches: Attitudes and Perceptions of Beach Users and Residents of the Mid-Atlantic Region*, provides an extensive analysis of ocean beach use by both Delaware residents and out-of-state visitors. The study was a cooperative effort of the Division of Soil and Water Conservation, Delaware Department of Natural Resources and Environmental Control (DNREC); the U.S. Army Corps of Engineers, Philadelphia District; and the University of Delaware Sea Grant Marine Advisory Service.

The study sought to determine beach users' and non-beach users' willingness-to-pay for using Delaware beaches, their attitudes toward beach replenishment efforts, and their willingness to contribute to a voluntary annual beach protection fund. Beach users were also asked about their motives for selecting certain Delaware beaches and their use patterns, their understanding of certain beach management practices, and support for various options for funding beach replenishment. Socio-economic information was also collected to better characterize the respondents.

A two-part study was initiated during the summer of 1993. The first component of the study included on-site interviews of 562 beach users at five Delaware ocean beach communities (Rehoboth Beach, Dewey Beach, Bethany Beach, South Bethany Beach, and Fenwick Island). The second component consisted of a mail survey of more than 1,000 residents living within a five-state regional area and the District of Columbia. After undeliverable questionnaires were accounted for, a total of 348 completed surveys were returned for a 39 percent response rate.

Initially, frequency data were obtained for each component of the study. In addition, in the on-site part of the study, responses from the five individual beach communities are presented and discussed. The mail-survey responses were also examined by whether respondents owned beach property or were non-beach property owners. There was also a small number of mail respondents (n=46) who indicated that they did not use Delaware ocean beaches. These individuals still provided useful opinions about whether they would support beach replenishment efforts.

The study findings revealed that on-site respondents were primarily residents of two states, Pennsylvania (28%) and Maryland (28%), with 16 percent being Delaware residents. The greatest percentage of mail respondents came from Delaware (38%)--Delaware residents were oversampled in the mail survey--and Maryland (26%). Most on-site visitors were visiting the Delaware beach area for one week or less (76%). Only 12 percent of the on-site respondents owned property in an ocean beach community, whereas 50 percent of mail respondents indicated that they owned beach property. (Beach property owners were also intentionally oversampled in the mail survey.)

When asked to indicate what attracted them to certain Delaware beaches, on-site and mail respondents voiced similar concerns. On a 1 to 5 scale (1 = strongly disagree and 5 = strongly agree), each group indicated the following attributes were especially important: "enjoying the visual qualities of the beach scenery" (both reporting 4.4 ratings), "engaging in beach-related activities" (4.4--on-site; 4.1--mail), "the town keeps the beach clean and attractive" (4.3--on-site; 4.2--mail), and "socializing with family, friends and others" (4.1--on-site; 4.2--mail).

The attributes that received the lowest ranking from both groups included: "to be with a large number of people" (2.2--on-site; 1.8--mail); "the availability of public restrooms" (2.7 for both groups); and "there is adequate parking" (3.0 for both groups). On-site respondents also noted that solitude (2.8) was not an important attribute for them; mail respondents noted that the availability of beach rentals and concessions was not of primary importance to them (2.8).

On-site respondents were asked for their perceptions of beach crowding and how the number of people that were on the beach affected their enjoyment on the day they were interviewed. On a nine-point scale (1 = not at all crowded and 9 = extremely crowded), the average crowding rating was 4.7. Most of the respondents (46%) rated the crowding to be moderate (between 4 and 6); 32 percent rated it not crowded (between 1 and 3); and 23 percent rated the crowding to be heavy (between 7 and 9).

Even though 68 percent of the respondents rated the crowding to be moderate or heavy, the majority of all beachgoers indicated that this did not have a negative impact on their enjoyment of the beach. On a nine-point scale (1 = increased enjoyment and 9 = decreased enjoyment), the average enjoyment rating was 4.5. Sixty-five percent of all respondents indicated the number of people on the beach had no effect on their enjoyment (between 4 and 6); 26 percent indicated the number of people increased their enjoyment (between 1 and 3); and 10 percent reported that the number of people decreased their enjoyment (between 7 and 9).

On-site respondents were also given the opportunity to rate the overall enjoyment of their beach experience on a scale of 1 to 10, with 10 being a perfect day. On average, respondents rated their beach experience 8.4, indicating that most thought it was near perfect. Twenty-three percent of all respondents rated their beach experience on the day they were interviewed a perfect "10."

There were no noticeable differences between on-site respondents and mail respondents with regard to people's understanding of beach management techniques and attitudes toward sand replenishment. Using the same five-point scale that was discussed earlier, both groups ranked the statement "a wide sandy beach will protect beachfront property and preserve the coastal economy" the highest (3.9). This was followed by "sand replenishment should be used to maintain wide beaches" (3.8); "if I know the beaches are kept replenished with sand, it would give a sense of security to my family

and me" (3.5--on-site; 3.6--mail); and finally, "jetties, groins and bulkheads are effective at slowing erosion" (3.4).

The questions that sought input on who should help pay for sand replenishment also exhibited no differences between the two groups. Both groups felt that state government (4.1--on-site; 4.0--mail) and local governments (4.1--on-site; 4.0--mail) should be the primary providers of funds to support beach nourishment. Both groups also felt strongly that everyone who uses and benefits from the beach should help support replenishment efforts (3.8--on-site; 4.0--mail). The least favored option for helping support beach replenishment was from the federal government (3.4--on-site; 3.5--mail).

Both groups were asked whether they would pay a certain amount (bid amounts varied between \$1.00 and \$5.00) for a day's use of the beach. Seventy-seven percent of the on-site respondents and 76 percent of mail respondents were willing to pay some amount per day to use the beach. The average amount that all on-site respondents were willing to pay was \$3.01, and the average for all mail respondents was \$2.85. For those who were not willing to pay a fee to use the beach, the following reasons were most often mentioned by both groups: they already paid through other means; they objected to the daily fee payment method; and they did not want to place a dollar value on the experience.

A second question asked of both groups sought to determine if they would pay a greater amount to use a beach that had been replenished with sand. Thirty percent of the on-site respondents and 21 percent of the mail respondents were willing to pay more to use a widened beach. The average willingness-to-pay was \$3.70 for all on-site respondents and \$3.50 for all mail respondents.

Seventy-nine percent of on-site respondents were willing to contribute to a voluntary annual beach protection fund which would insure the beaches would be maintained for their use as well as that of future generations. Of the mail respondents, only 34 percent indicated that they would contribute to an annual beach protection fund.

The average amount that all on-site users were willing to contribute to the hypothetical beach fund was \$63.69. The amount of the contributions from those who were willing to contribute ranged between \$3.00 and \$2,500. On-site respondents who were not willing to contribute to the annual beach fund mentioned the following reasons for their reluctance: they already paid through other means; there was not enough information to make a decision; and they objected to the annual contribution method of payment.

The average amount that all mail respondents were willing to contribute was \$26.60. The annual contributions from those willing to contribute ranged between \$1.00 and \$1,000. The 66 percent of the mail respondents who were unwilling to contribute mentioned the following reasons: they already paid through other means; there was not

enough information to make a decision; and they could not place a dollar value on that type of beach protection.

Further analysis explored the differences among on-site respondents at individual beach communities. The differences with respect to most of the variables were very small or nonexistent. The additional analysis of mail survey respondents, which focused on beach property owners, non-property owners, and non-beach users exhibited many more differences when comparisons were made.

INTRODUCTION

Federal law mandates that the U.S. Army Corps of Engineers conduct an assessment of the economic benefits of coastal beaches prior to approving shoreline protection projects. For a project to be economically justified, the benefits associated with the project must be greater than its costs. The Delaware ocean shoreline is currently undergoing such an assessment. There are numerous elements that must be considered during the comprehensive evaluation. One important component of the assessment includes evaluating recreational beach use and determining beach users' willingness to pay (WTP) for beach enhancement.

As part of a cost share requirement by the Delaware Department of Natural Resources and Environmental Control (DNREC), Division of Soil and Water Conservation, the University of Delaware Sea Grant Marine Advisory Service was contracted to conduct the analysis of recreational beach users. The work undertaken had two distinct parts. The first part consisted of interviewing recreational beach users at five ocean beach communities during the summer of 1993. The second part of the study involved developing a survey and mailing it to 1,004 randomly selected residents within the Mid-Atlantic region. In total, 910 individuals provided responses through the on-site and mail survey efforts.

Both efforts were designed to help determine individuals' willingness to pay for a day on the beach (both with and without beach enhancement) and whether they would contribute to an annual beach protection fund. Questions were also designed to collect attitudinal information on why respondents visited selected beaches, to solicit information on their knowledge about certain beach management options, to determine how people would change their beach visitation patterns if user fees were imposed, and to collect necessary demographic information to accurately describe the study respondents.

The geographic setting for the study of Delaware beach visitors included Delaware oceanfront communities from Rehoboth Beach (at the northern end of the Delaware coastline) to Fenwick Island (at the southern end). The Delaware ocean coastline is approximately 24 miles long, and much of the land area is contained within state parkland. A series of municipalities and unincorporated communities are interspersed along the coastal barrier island.

The largest of the communities (from a population and tourism infrastructure perspective) is the town of Rehoboth Beach. It is a heavily developed town with many accommodations (hotels, cottages, and condos) and an active business community. There is a one-mile long boardwalk fronting the ocean beach.

While Dewey Beach is less developed than Rehoboth Beach to its north and Bethany Beach to the south, it still plays host to many summer visitors at cottages, motels, and condos. There are numerous eating establishments, and this community does not have a boardwalk fronting its coastline.

Bethany Beach is the second largest municipality. It is less developed than Rehoboth Beach, and more developed than Dewey Beach, and accommodates many thousands of summer visitors in its hotels, motels, condos, and beach cottages. The town also maintains a boardwalk along its oceanfront that is about one-half mile in length.

The two other communities that were included in the study (South Bethany and Fenwick Island) are somewhat different in character than the three previously mentioned ones. Beachfront cottages and houses dominate the landscape with much smaller business communities associated with them. The only significant business activity is contained along the major beach thoroughfare--Route 1 (Figure 1).

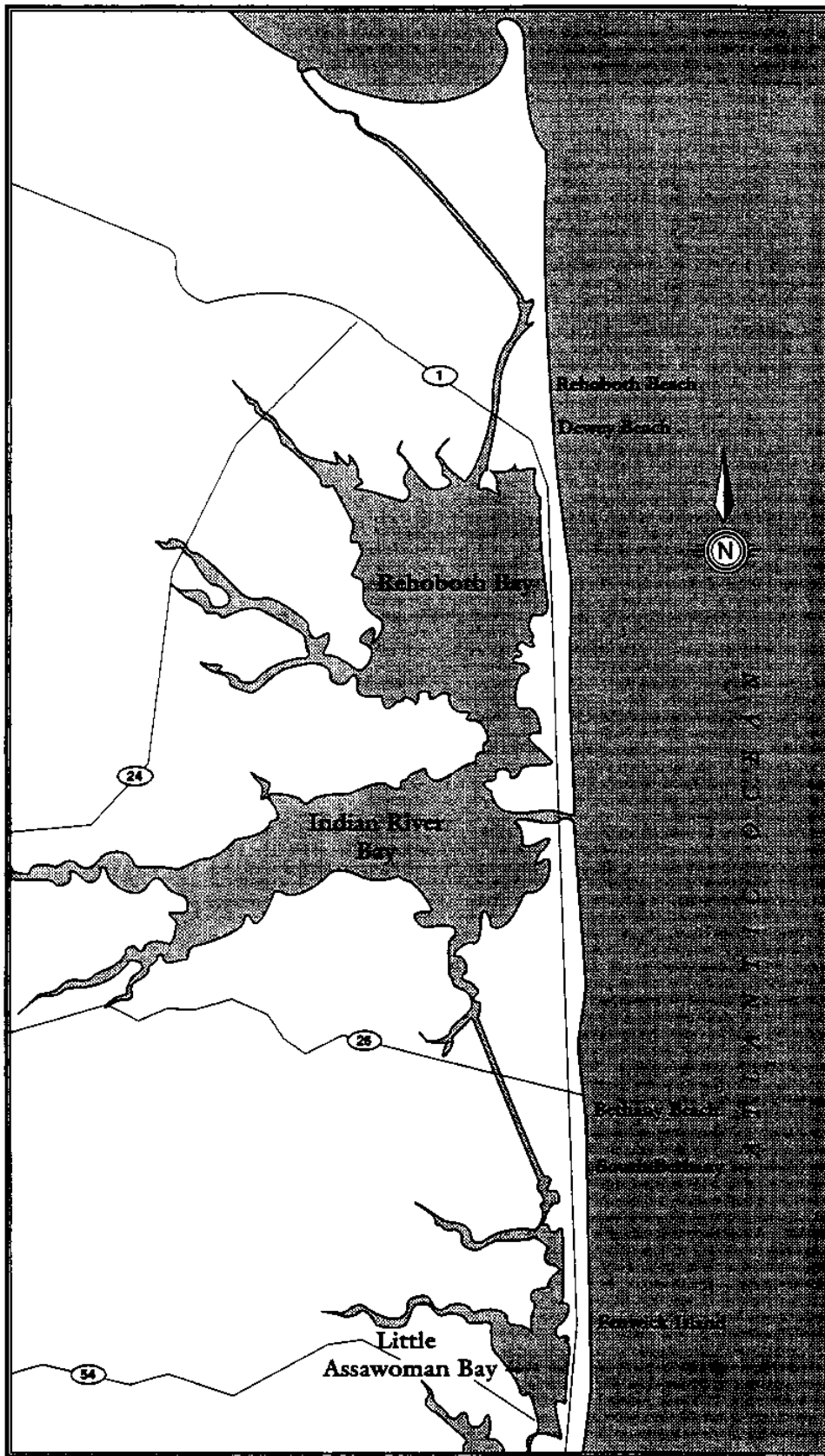


Figure 1. Map depicting Delaware ocean beach communities sampled during on-site component of study.

METHODS

Beachgoers in the five Delaware ocean beach communities were surveyed during the summer of 1993. Five hundred and sixty-two interviews were completed on 34 sampling days. The individual interview counts for each beach community were as follow: Rehoboth Beach--129, Dewey Beach--118, Bethany Beach--115, South Bethany Beach--96, and Fenwick Island--104. Seventeen percent of the interviews were conducted in June; 40 percent were conducted in July; and 43 percent were completed in August. Frequency data for all of the beach areas collectively were tabulated as were the individual data by beach community. Regression analysis and certain cross-tabulations were performed to further analyze and describe the respondents and their behavior.

A mail survey also was undertaken to collect additional information from both beach users and non-beach users. The sample of individuals who received the mail survey was generated in two ways. First, 200 individuals owning property in the five ocean beach communities were randomly selected from Sussex County tax maps. These individuals were targeted since the on-site survey did not provide a large sample of local property owners. This method insured that we would be able to ascertain the attitudes of this important segment of the population. Second, approximately 800 names and addresses of individuals living within a five-state area (plus the District of Columbia) were randomly generated by the private research firm, Survey Sampling Inc. (located in Fairfield, Connecticut).

Questionnaires were mailed to the resulting sample of 1,004 individuals on September 29, 1993. A postcard reminder (mailed October 8) and two complete follow-up mailings (mailed October 26 and November 2) took place for those who had not responded by these dates. After accounting for undeliverable mailings (e.g., no forwarding address, incomplete address, etc.), the effective sample was reduced from 1,004 to 895. Three hundred and forty-eight completed surveys were returned for a 39 percent response rate. The individual breakdown of surveys mailed and the response rate by area is as follows: Delaware beach property owners--200 mailed (73% response rate); Sussex County, DE--137 mailed (46% response rate); Kent and New Castle counties, DE--128 mailed (34% response rate); Pennsylvania--130 mailed (25% response rate); Maryland--130 mailed (26% response rate); Virginia--130 mailed (23% response rate); New Jersey--74 mailed (16% response rate); and the District of Columbia--75 mailed (33% response rate) (Table 1).

The questions asked of respondents in the field and the mail components of the study were constructed as similarly as possible. However, there are distinct differences between interviewing an individual in person in a field setting and mailing a questionnaire which asks people to respond to the same questions. Those administering the on-site surveys had the benefit of being able to more fully explain and discuss

Geographic Location	No. Original Mailing	No. Undeliverable	No. Responses	Percent Response (after undeliverables)
Delaware beach communities	200	4	144	73
Sussex County, Delaware	137	35	47	46
Kent/New Castle counties, Delaware	128	22	36	34
Pennsylvania	130	8	30	25
Maryland	130	11	31	26
Virginia	130	9	28	23
New Jersey	74	7	11	16
Washington, DC	75	11	21	33
TOTAL	1,004	107	348	39

portions of the survey if they were asked. In the mail survey, the written instructions for answering the questions had to be clear and concise. In addition, it was expected that a portion of the respondents to the mail survey would be non-users who had never had a Delaware beach experience.

Three fundamental differences were apparent with regard to administering the two surveys: (1) All of the individuals responding to the on-site interviews were visiting the Delaware beach area in 1993 and their responses were based on this time period. Mail respondents were asked to complete all of the questions on the survey instrument if they had visited a Delaware ocean beach at any time. Those who had never visited a Delaware beach were directed to skip certain questions that did not apply to them. (2) During the on-site interviews, many of the questions that were asked were specifically targeted to the beach the respondents were using. The mail survey respondents were asked to identify the beaches they had visited in Delaware and answer questions specific to the beach they considered to be their primary-use beach. There was no way to guarantee this direction was followed. (3) When on-site users were asked whether they would pay for an enhanced beach, two 8" x 10" colored photographs showing an un-nourished beach and a nourished beach were used to elicit a response. Due to cost limitations, the mail survey respondents were sent the same two photos in black and white and only measuring 4-1/2" x 7" in size.

A question in both surveys asked if the wording of the questions that were asked was understandable. Respondents from both groups generally felt that the questions presented to them were clearly worded and understandable. However, on-site

respondents (62%) were more likely than mail respondents (32%) to indicate that the questions were "very clear." Only 4 percent of the on-site group noted that the questions were "moderately clear," "unclear," or "very unclear" compared to 24 percent of the mail survey group. There were no apparent differences observed between beach communities or beach users in the two surveys regarding perceptions of question clarity (Tables 2 and 3).

Question Clarity	On-site Respondents					
	All (n=559)	Rehoboth Beach (n=128)	Dewey Beach (n=117)	Bethany Beach (n=115)	South Bethany (n=96)	Fenwick Island (n=103)
Very Clear	62	65	59	57	65	66
Clear	34	33	37	39	28	33
Moderately Clear	3	1	4	4	6	1
Unclear	1	2	0	0	1	0
Very Unclear	0	0	0	0	0	0

Question Clarity	All (n=336)	Beach Users		
		Non-Property Owners (n=150)	Property Owners (n=141)	Non-Beach Users (n=46)
Very clear	32	38	25	36
Clear	46	43	47	47
Moderately Clear	19	17	22	13
Unclear	3	1	5	2
Very Unclear	1	1	1	2

STUDY RESULTS

The study results are presented in a sequential fashion. Initially, respondents' socioeconomic (demographic) characteristics are presented--e.g., income, age, education, sex, etc. The next discussion provides a basic description of the respondents--e.g., state of residence, number of visits to the beach each year, visiting group size, length of time spent on beach, etc. Their attitudes about visiting the beach and understanding of beach management practices are presented next. Another section presents individuals' willingness to pay for visiting the existing beach, as well as their willingness to pay for an enhanced beach (replenished with sand to widen it). Last, individuals' willingness to contribute to an annual beach protection fund is explored.

In addition to overall frequency data for the sample of on-site beach users, results are provided by each beach community. For the mail survey respondents, overall frequencies are provided, as are frequencies for beach users (non-property owners and beach property owners) and non-beach users. In many instances where frequency data are provided, column totals may not equal 100 percent due to rounding.

Of the 348 respondents to the mail survey, 46 respondents indicated that they had never visited an ocean beach in Delaware. These individuals were still considered to be an important segment of "non-beach users" who could provide important information about their attitudes and perceptions related to beach management. They were instructed to complete the portions of the survey instrument that dealt with their attitudes about beach management, their willingness to pay for a day on a Delaware beach, both before and after sand renourishment, their demographic status, and their willingness to contribute annually to a beach protection fund.

Beach users in the mail survey were further segmented into coastal property owners and non-owners. There was a total of 150 non-property owning beach users. One hundred and forty one respondents in the mail survey owned property in the coastal communities. Of this total, 12 percent indicated that the property was their primary residence and 88 percent indicated that it was a secondary residence.

SOCIOECONOMIC CHARACTERISTICS

Employment

There were distinct differences between mail survey respondents and on-site respondents with regard to employment (Tables 4 and 5). Seventy-six percent of the on-site beachgoers were employed full time or part time versus 62 percent of the mail survey respondents. A further difference was noted with respect to retired

individuals. Twenty-seven percent of mail respondents were retired compared to 8 percent of on-site respondents.

Individual beach communities exhibited some differences with regard to employment (Table 4). Eighty-nine percent of Dewey Beach respondents were employed full time or part time compared to Fenwick Island and Bethany Beach where 70 percent of the respondents were employed full or part time. Only 3 percent of Dewey Beach's respondents were retired compared to a high of 11 percent in Fenwick Island.

Notable differences were observed when comparisons were made between mail survey respondents (Table 5). Non-property owners (65%) were more likely to be employed full-time than either beach property owners (52%) or non-beach users (57%). Property owners (31%) had a greater tendency to be retired than either of the other two groups (24%--non-property owners; 22%--non-beach users). There was a greater percentage of non-beach users (13%) indicating that they were students, whereas only 1 percent of non-property owners indicated the same.

Education

The educational level of the two survey groups was fairly consistent. Sixty-nine percent of the mail respondents were college graduates, with 44 percent of them reporting post-graduate education (Table 5). Fifty-nine percent of the on-site beachgoers indicated that they had completed college, with 28 percent of them reporting further education (Table 4).

When beach communities in the on-site survey were examined, two-thirds of the South Bethany respondents were college graduates, with 38 percent reporting post-graduate education (Table 4). The community with the smallest number of college graduates was Fenwick Island (50%). In the other beach communities, between 55 percent and 67 percent of respondents reported that they were college graduates.

There was little difference with respect to education between different segments of the mail survey respondents (Table 5). The majority of all groups were well educated and college graduates. Seventy-seven percent of beach property owners were college graduates, which was slightly higher than non-property owners (63%) and non-beach users (74%).

Table 4. Descriptive profile of on-site respondents (percent).						
	All (n=562)	Rehoboth Beach (n=129)	Dewey Beach (n=118)	Bethany Beach (n=115)	South Bethany (n=96)	Fenwick Island (n=104)
EMPLOYMENT						
Employed Full Time	65	68	75	61	64	55
Retired	8	9	3	6	8	11
Employed Part Time	11	8	14	9	10	15
Full-Time Homemaker	9	8	6	11	9	9
Student	6	4	2	10	4	9
Not Employed	2	2	0	2	4	1
Other	1	2	0	1	0	1
EDUCATION						
Some High School	2	0	2	4	2	4
High School Graduate	17	20	15	19	13	15
Some College	22	19	20	22	19	31
College Graduate	31	30	34	33	29	29
Post Graduate	28	30	30	22	38	20
AGE						
10-19	3	0	3	7	3	5
20-29	15	13	19	10	14	17
30-39	30	31	37	23	31	28
40-49	31	30	27	40	28	31
50-59	11	16	10	12	10	8
60-69	7	9	3	4	9	10
70+	3	2	2	4	4	2
INCOME						
Under \$10,000	4	2	4	4	2	9
\$10,000-19,999	3	2	4	5	1	1
\$20,000-29,999	6	7	6	6	5	7
\$30,000-39,999	12	12	13	10	10	14
\$40,000-49,999	13	12	17	14	10	14
\$50,000-74,999	30	37	23	22	37	33
\$75,000-99,999	18	12	19	26	17	15
\$100,000 & above	14	16	14	13	17	8
OTHER DEMOGRAPHIC VARIABLES						
Percent Married	74	78	64	78	80	70
Percent Male	43	46	44	41	40	42
Percent White/ Caucasian	97	95	98	96	99	99

Table 5. Descriptive profile of mail respondents (percent).

	Beach Users			
	All (n = 348)	Non-Property Owners (n = 150)	Property Owners (n = 141)	Non-Beach Users (n = 46)
EMPLOYMENT				
Employed Full Time	58	65	54	57
Retired	27	24	30	22
Employed Part Time	4	2	6	4
Full-Time Homemaker	4	3	8	0
Student	2	1	0	13
Not Employed	<1	1	0	0
Other	4	5	3	4
EDUCATION				
Some High School	2	2	0	2
High School Graduate	13	17	7	13
Some College	16	18	16	11
College Graduate	25	22	27	33
Post Graduate	44	41	50	41
AGE				
10-19	1	1	0	2
20-29	3	1	0	16
30-39	17	24	7	20
40-49	23	26	21	20
50-59	22	22	27	16
60-69	16	12	22	16
70+	19	14	23	11
INCOME				
Under \$10,000	3	4	0	8
\$10,000-19,999	4	6	2	3
\$20,000-29,999	6	6	5	8
\$30,000-39,999	12	16	6	16
\$40,000-49,999	12	11	12	16
\$50,000-74,999	18	21	14	13
\$75,000-99,999	14	11	16	18
\$100,000 & above	32	24	45	18
OTHER DEMOGRAPHIC VARIABLES				
Percent Married	75	69	81	74
Percent Male	66	65	66	67
Percent White/Caucasian	96	97	99	84

Age

Respondents' ages were tabulated, and there was a significant difference between on-site and mail survey respondents. Most notable was the higher age of the mail respondents. Fifty-seven percent of the mail respondents were over the age of 50, versus 22 percent for the on-site beachgoers. Seventy-six percent of all on-site respondents were between the ages of 20-49, compared to 43 percent of the mail respondents.

When individual beach communities were examined from the on-site group, Rehoboth Beach had the greater percentage of individuals over age 50. Twenty-seven percent of this beach's respondents were over age 50. The "youngest" beach crowd was found in Dewey Beach, where only 15 percent of the respondents were over age 50 and 56 percent were between the ages of 20-39 (Table 4).

When age levels were examined, distinct differences between mail-sample segments were observed. Non-beach users were younger than both segments of beach users (Table 5). Eighteen percent of non-beach users were under 30 years of age, versus 2 percent of non-property owners. There were no beach property owners in the sample under 30 years of age. One-half of the non-property owners were between the ages of 30 and 49, compared with 28 percent of the property owners and 40 percent of the non-beach users. Forty-five percent of the beach property owners were greater than 60 years of age; however, this same age group accounted for only 26 percent of non-property owners and 27 percent of non-beach users.

Income

The income levels of mail survey respondents were somewhat higher than those of on-site beachgoers. Forty-six percent of the mail respondents reported incomes greater than \$75,000, whereas 32 percent of on-site beach users reported similar incomes. Thirteen percent of each group reported income levels of under \$30,000.

When income levels within individual communities in the on-site part of the study were examined, Bethany Beach respondents (39%) reported the highest percentage of people earning over \$75,000; Fenwick Island beachgoers (23%) reported the lowest percentage of people earning this amount or greater. Fenwick Island respondents (17%) also reported the greatest percent of individuals earning less than \$30,000. South Bethany (8%) included the fewest individuals with incomes under \$30,000 (Table 4).

Non-beach users and non-property owning beach users reported lower average incomes than did beach property owners. For example, 16 percent of non-property owners and 19 percent of non-beach users reported incomes under \$30,000. Only 7 percent of beach property owners reported incomes in this range. Sixty-one percent of beach property owners reported average incomes of greater than \$75,000, whereas fewer non-property owners (35%) and non-beach users (36%) reported incomes at this level (Table 5).

Other Demographic Variables

Other demographic variables that were explored included marital status, sex, and race. No significant differences were found between marital status and race between the on-site and mail respondents. Seventy-five percent of on-site respondents were married, compared with 74 percent of mail respondents. Ninety-seven percent of on-site beachgoers were Caucasian, as were 96 percent of the mail respondents. More females (57%) were interviewed in the on-site portion of the study, compared with 66 percent of males completing the mail survey.

The only observable difference between these variables and the various beach communities was with respect to marital status. Only sixty-four percent of Dewey Beach respondents were married compared to 70 percent or greater for the other communities (Table 4).

The percent of married respondents showed little difference for all segments of the mail sample. Non-property owners (69%) were slightly less inclined to be married than the property owners (81%) or non-beach users (74%). There were no observed differences with regard to gender in the mail survey. About two-thirds of all groups of respondents were male. The race/ethnic variable exhibited noticeable differences, with beach property owners (99%) and non-property owners (97%) almost exclusively dominated by whites/Caucasians. Non-beach users responding to the mail survey reported greater ethnic diversity, with 84 percent indicating that they were white/Caucasian (Table 5).

State of Residence

Both on-site and mail subjects' permanent place of residence was recorded (Tables 6 and 7). The selection of on-site study subjects, with regard to residence, was completely random, with no knowledge of where the selected individuals resided. More than one-half of the on-site respondents lived in two states--Pennsylvania (28%) and Maryland (28%). Sixteen percent were Delawareans, and 9 percent were residents of Virginia. The mail sample consisted of a stratified random selection, with two distinct strata in Delaware (beach property ownership and remainder of state), four other states within the Mid-Atlantic region, and the District of Columbia. Thirty-eight percent of the mail respondents resided in Delaware, followed by Maryland (26%), Virginia (13%), and Pennsylvania (11%).

When individual beach communities were examined in the on-site component of the study, Rehoboth Beach (37%), Dewey Beach (31%), and Bethany Beach (30%) had more beach visitors from Pennsylvania than from any other state (Table 6). South Bethany Beach (33%) and Fenwick Island (32%) had the highest percentage of their beach users from Maryland. Delawareans were represented most often in Fenwick Island (24%) and Dewey Beach (20%).

State of Residence	All (n=562)	Rehoboth Beach (n=129)	Dewey Beach (n=118)	Bethany Beach (n=115)	South Bethany (n=96)	Fenwick Island (n=104)
PA	28	37	31	30	25	14
MD	28	28	18	29	33	32
DE	16	13	20	13	13	24
VA	9	7	13	8	10	9
NY	4	2	5	4	3	5
NJ	4	2	2	5	8	2
OH	2	2	3	1	1	4
CT	1	2	1	1	0	1
DC	1	1	2	2	0	1
Other	8	6	9	9	6	10

State of Residence	All (n=348)	Beach Users		Non-Beach Users (n=46)
		Non-Property Owners (n=150)	Property Owners (n=141)	
DE	38	48	35	7
MD	26	15	40	20
VA	13	13	13	20
PA	11	10	6	28
DC	7	11	1	9
NJ	4	2	1	17
NY	1	0	1	0
CT	1	1	1	0
Other	1	1	1	0

Non-beach users in the mail survey were mainly represented by residents from Pennsylvania (28%), Maryland (20%), Virginia (20%), and New Jersey (17%). Beach users were principally Delaware and Maryland residents. For non-property owners, 63 percent resided in these two states, with 34 percent residing in Virginia, Washington, DC, and Pennsylvania. For property owners, three-quarters of the respondents were residents of Delaware and Maryland.

BEACH-USE PATTERNS

Type and Length of Visit

Ninety-two percent of all the beachgoers who were interviewed on site were on an overnight stay in the local beach community. South Bethany (99%) had the greatest percentage of overnight visitors, and Rehoboth Beach (82%) had the lowest percentage (Table 8).

Seventy-six percent of all overnight visits were of short duration--one week or less; 13 percent were longer than one week. The remaining ten percent of beach users sampled were seasonal (8%) or permanent (2%) residents of the Delaware beach area. Dewey Beach (82%) and Rehoboth Beach (79%) were the communities most favored for short-duration visits, whereas Bethany Beach (17%) and South Bethany (15%) were most favored for longer visits. Most seasonal residents tended to reside in South Bethany (10%) and Fenwick Island (10%) (Table 8).

Table 8. Percent of on-site respondents who visited beach area overnight and length of stay.						
Type of Visit	All (n = 562)	Rehoboth Beach (n = 129)	Dewey Beach (n = 118)	Bethany Beach (n = 115)	South Bethany (n = 96)	Fenwick Island (n = 104)
Percent on Overnight Visits	92	82	97	92	99	93

Length of Stay	All (n = 517)	Rehoboth Beach (n = 107)	Dewey Beach (n = 113)	Bethany Beach (n = 106)	South Bethany (n = 94)	Fenwick Island (n = 97)
Weekend Trip	1	2	1	2	2	0
Short Vacation (1 week or less)	75	79	82	67	72	75
Long Vacation (> 1 week)	13	12	10	18	15	9
Seasonal Resident	8	7	6	9	10	10
Other*	2	0	1	5	1	5
* Includes those who own property and are full-time or part-time residents of beach community.						

Residential Beach Property Ownership

Both on-site and mail respondents were queried as to whether they owned residential property in the Delaware beach area. The mail response was much higher since property owners were targeted in this component of the study. While 20 percent of the total mail sample were selected on the basis of property tax maps, 50 percent of the respondents reported that they were coastal property owners, suggesting that property owners were much more likely than others to respond to a survey on beach use and replenishment. Nine percent of the mail respondents noted this home was their primary residence and 41 percent indicated it was a seasonal residence. Twenty percent of the mail survey respondents owning property indicated that they offered it for seasonal or off-season rentals. Twelve percent of the on-site respondents indicated that they owned beach property, with 1 percent indicating it was their primary residence, and 11 percent noting it was a seasonal home (Table 9).

Own Beach Property	On-site Respondents (n = 561)	Mail Respondents (n = 346)
No Ownership	88	50
Own "Second" Home	11	41
Own "Primary" Home	1	9

Use of Delaware Beaches

Sixty-nine percent of on-site beach users reported visiting Delaware beaches every year; another 9 percent visit every other year; and 8 percent visit every two to five years (Table 10). Ten percent of those interviewed were first-time visitors to a Delaware ocean beach.

Mail respondents were asked when they last visited a Delaware ocean beach (Table 11). The majority (67%) of all respondents visited a beach in 1993 (the year the study was conducted). As might be expected, 100% of those who own coastal property visited an ocean beach in 1993. Non-property owners also reported visiting a Delaware ocean beach recently, with 78 percent having visited at some time during the 1990s (Table 11).

Mail respondents were instructed to indicate the number of days they spend on any Delaware ocean beach in an average year. Rehoboth Beach was by far the most popular beach to visit by mail respondents; it was visited by 35 percent of the sampled residents of the Mid-Atlantic region, followed by the three state park beaches--Cape Henlopen Park, Delaware Seashore State Park and Fenwick Island State Park--(28%),

Bethany Beach (22%), Dewey Beach (18%), Fenwick Island (14%), South Bethany Beach (12%), and "other" ocean beaches (2%) (Table 12).

Table 10. On-site respondents' number of visits to Delaware beach area (percent).

How Often Visit Delaware Beaches	All (n=560)	Rehoboth Beach (n=129)	Dewey Beach (n=117)	Bethany Beach (n=115)	South Bethany (n=95)	Fenwick Island (n=104)
First Visit	10	11	11	10	6	9
Every Year	69	61	64	79	70	74
Every Other Year	9	12	10	5	12	6
Every 2-5 Years	8	10	12	2	10	9
Less than Every 2-5 Years	4	5	3	4	3	3

Table 11. Mail respondents' year of last visit to a Delaware ocean beach (percent).

Year of Visit	All (n=332)	Beach Users	
		Non-Property Owners (n=143)	Property Owners (n=141)
1993	67	57	100
1992	6	13	0
1991	2	4	0
1990	2	4	0
1980s	8	18	0
1970s	2	4	0
1960s	<1	0	0
1950s	0	0	0
1940s	<1	1	0
Never Visited	14	0	0

Beach	Percent Who Visited	Average No. Days Visited/Year
Rehoboth Beach	35	28
Bethany Beach	22	30
Dewey Beach	18	35
Fenwick Island	14	37
Cape Henlopen State Park	13	6
South Bethany	12	33
Delaware Seashore State Park	10	9
Fenwick Island State Park	5	17
Other Ocean Beaches	2	13

The beach communities of Fenwick Island (37 days), Dewey Beach (35 days), South Bethany (33 days), Bethany Beach (30 days), and Rehoboth Beach (28 days) received the highest average number of days' visitation by mail respondents, possibly reflecting the higher incidence of property owners who spent substantial time on their local beaches.

On average, beach visitors in the on-site survey spent 16.7 days per year on Delaware's ocean beaches (Table 13). Thirty percent spent between one and five days per year on the beaches, and 34 percent spent between six and ten days. Seven percent of those interviewed in person spent more than 50 days per year on Delaware's ocean beaches. Those sampled at Bethany Beach and Fenwick Island generally reported spending the most days at the beach--19.2 and 21.5 days per year, respectively (Table 13).

The average number of days spent on the beach was 36.5 days for all mail respondents. About one-half (48%) visited fewer than ten days per year. Twenty-seven percent spent more than 30 days on Delaware beaches. As one would imagine, property owners (56.7 days) showed a much larger average number of days visiting than non-property owners (18.6 days). Forty-seven percent of property owners spent more than 30 days per year on Delaware beaches compared with 9 percent of non-property owners (Table 14).

Table 13. Average number of days spent on Delaware beaches annually by on-site respondents (percent).

Number of Days Spent on Delaware Beaches	All (n=560) (avg.=16.7)	Rehoboth Beach (n=129) (avg.=13.3)	Dewey Beach (n=118) (avg.=13.7)	Bethany Beach (n=115) (avg.=19.2)	South Bethany (n=96) (avg.=16.6)	Fenwick Island (n=104) (avg.=21.5)
1-5	30	42	37	25	17	22
6-10	34	29	31	37	43	34
11-20	16	12	13	17	22	17
21-30	8	9	9	7	6	9
31-50	6	5	7	8	5	5
51-90	6	3	4	6	5	11
>90	1	1	0	3	1	3

Table 14. Average number of days spent on Delaware beaches annually by mail respondents (percent).

Number of Days Spent on Delaware Beaches	All (n=196) (avg.=36.5)	Beach Users	
		Non-Property Owners (n=99) (avg.=18.6)	Property Owners (n=93) (avg.=56.7)
1-5	30	53	4
6-10	18	16	19
11-20	11	10	12
21-30	14	12	17
31-50	9	3	16
51-90	9	2	16
>90	9	4	15

Typical Group Size

Enjoying Delaware's recreational beaches is definitely a group activity. Overall, only 6 percent of on-site users interviewed were alone (Table 15). Forty percent of on-site visitors were in groups of two to three people. Another 28 percent were in group sizes of four to five. Thirteen percent were in groups of eight or more people. Fenwick Island beach visitors (10%) were most likely to visit the beach alone, while Rehoboth

Beach visitors (2%) were the least likely to visit alone. Rehoboth Beach respondents, however, did report the smallest average group size (3.5 people per group). South Bethany respondents visited the beach in the largest groups, with 38 percent indicating they visited with six or more people. Only 13 percent of Rehoboth Beach respondents reported being in groups of more than six people.

Fourteen percent of mail survey respondents reported spending time on the beach alone. Forty-nine percent of the respondents reported visiting the beach in groups of two to three people. Twenty-seven percent reported visiting Delaware beaches in groups of four to five. Four percent reported that they typically visit Delaware beaches with eight or more people in their group (Table 16). Beach property owners tended to visit the beach in slightly larger group sizes than non-property owners (15% vs. 6% in groups of six people or more).

No. of People in Beach Group	All (n = 562) (avg. = 4.4)	Rehoboth Beach (n = 129) (avg. = 3.5)	Dewey Beach (n = 118) (avg. = 4.4)	Bethany Beach (n = 115) (avg. = 4.6)	South Bethany (n = 96) (avg. = 5.4)	Fenwick Island (n = 104) (avg. = 4.6)
1	6	2	5	9	7	10
2-3	40	54	38	39	32	35
4-5	28	31	32	30	22	24
6-7	13	10	11	10	17	16
8-9	6	2	7	4	9	7
10-11	4	1	6	4	6	6
>11	3	0	1	5	6	3

Table 16. Mail respondents' typical beach group size (percent).			
No. of People in Beach Group	All (n=277) (avg.=3.3)	Beach Users	
		Non-Property Owners (n=135) (avg.=3.0)	Property Owners (n=136) (avg.=3.6)
1	14	16	10
2-3	49	52	46
4-5	27	26	29
6-7	6	2	10
8-9	2	1	3
10-11	1	1	1
>11	1	2	1

Time Spent on Beach

The average number of hours spent on the beach by on-site visitors was 4.7 hours. Forty-seven percent of all respondents spent between two and four hours on the beach; another 48 percent spent between five and seven hours (Table 17). There were no significant differences observed between visitors at the various beach communities. The amount of time spent on the beach was not asked in the mail survey.

Table 17. Number of hours spent on beach by on-site respondents (percent).						
No. of Hours Spent on Beach (day of interview)	All (n=562) (avg.=4.7)	Rehoboth Beach (n=129) (avg.=4.7)	Dewey Beach (n=118) (avg.=4.9)	Bethany Beach (n=115) (avg.=4.8)	South Bethany (n=96) (avg.=4.6)	Fenwick Island (n=104) (avg.=4.7)
2-4	47	50	39	49	53	46
5-7	48	47	57	44	42	51
8-10	5	3	4	7	5	3

ATTITUDES AND PERCEPTIONS

Reasons for Beach Selection

Those respondents who used Delaware beaches were instructed to rate the importance of certain attributes when visiting their favorite ocean beach. Both on-site respondents and mail respondents ranked many of the factors for visiting Delaware beaches the same. A five-point scale was used, with "1" indicating that they strongly disagreed with the statement that was presented to them and "5" indicating that they strongly agreed with it.

On-site respondents attached the most importance to enjoying the visual qualities of the beach scenery and engaging in beach-related activities (4.4 each on the five-point scale), a clean and attractive beach (4.3), closeness to the beach (4.2), and socializing with others (4.1). The least important beach attributes were the desire to be with a large number of people (2.2), followed by having public rest room facilities (2.7), and solitude (2.8) (Table 18).

There were very few differences in the data collected for various attributes from respondents at different beach communities. The only distinct differences were observed with respect to the two attributes, "There are adequate beach rentals and concessions" and "There are public rest room facilities." These differences between the community responses were understandable since certain communities had concessions and rentals (Rehoboth Beach, Dewey Beach, and Bethany Beach) and rest room facilities (Rehoboth Beach and Bethany Beach) at their beaches and others did not.

Mail respondents rated enjoying the visual qualities of the beach scenery (4.4) as their top attribute, followed by socializing with others (4.2), a clean and attractive beach (4.2), and engaging in beach-related activities (4.1). The least important attributes for mail respondents were the desire to be with a large number of people (1.8), followed by having public rest room facilities (2.7) and having adequate concessions and rentals (2.8) (Table 19).

Most property owner and non-property owner beach attribute ratings varied only slightly. Major differences were observed with regard to the attribute, "It is close to where I stay on vacation," which was rated higher by property owners (3.8) than by non-property owners (2.9). Non-property owners attached greater importance to the attributes, "There is little or no cost to enjoy it" (3.5 vs. 3.1); "There is adequate parking" (3.2 vs. 2.8); "There are adequate beach rentals and concessions" (3.0 vs. 2.5); and "There are public rest rooms available" (3.2 vs. 2.0).

Table 18. On-site respondents' reasons for visiting Delaware beaches (rank and percent).

Reason for Visiting Delaware Beaches	All (n = 530)*		Rehoboth Beach (n = 127)		Dewey Beach (n = 113)		Bethany Beach (n = 112)		South Bethany (n = 88)		Fenwick Island (n = 91)	
To enjoy visual qualities of beach scenery	4.4 ¹	97.1 ²	4.4	96.9	4.5	98.3	4.4	94.8	4.5	97.9	4.5	98.1
To engage in beach-related activities	4.4	95.2	4.4	96.1	4.4	92.4	4.3	93.8	4.5	96.9	4.5	97.1
The town keeps beach clean/attractive	4.3	92.8	4.4	96.1	4.0	88.9	4.3	92.2	4.3	92.6	4.4	94.1
To socialize with family/friends/others	4.1	89.6	4.1	89.2	4.1	87.3	4.1	90.4	4.3	93.7	4.0	88.3
It's close to home or where I am staying	4.2	86.4	3.9	81.3	4.1	84.7	4.2	88.7	4.3	88.4	4.3	90.3
It's wide enough to enjoy activities	3.9	84.9	3.8	82.1	3.7	79.4	3.9	81.1	4.1	90.5	4.2	93.9
Little or no cost to enjoy it	3.9	76.2	3.9	73.4	3.9	72.9	3.9	78.8	3.9	74.8	4.0	81.5
There are adequate beach rentals and concessions	3.2	52.2	3.6	70.5	3.3	53.7	3.5	63.0	2.4	26.4	2.5	24.3
There is adequate parking	3.0	41.6	3.1	49.2	2.4	23.8	3.3	53.8	3.2	47.5	2.9	38.1
For solitude (to be alone)	2.8	36.7	2.7	31.0	2.6	30.5	2.8	33.0	3.1	44.8	3.1	47.1
There are public rest room facilities	2.7	32.5	3.2	47.5	2.1	5.1	3.1	50.0	1.9	12.2	2.2	11.5
To be with a large number of people	2.2	18.2	2.1	14.8	2.4	22.0	2.2	18.2	2.2	20.8	2.0	15.5

* n's are based on average number of responses to each statement.
¹ Rankings are based on a 1-5 scale, with 1 = strongly disagree and 5 = strongly agree.
² Percentages are based on those respondents who "agreed" or "strongly agreed" to statement.

Table 19. Mail respondents' reasons for visiting Delaware beaches (rank and percent).

	Beach Users					
	All (n = 257)*		Non-Property Owners (n = 128)		Property Owners (n = 126)	
To enjoy visual qualities of beach scenery	4.4 ¹	95.7 ²	4.4	97.0	4.5	94.9
To socialize with family/friends/others	4.2	90.9	4.1	89.6	4.3	92.6
The town keeps beach clean/attractive	4.2	90.0	4.1	88.6	4.3	92.4
To engage in beach-related activities	4.1	85.4	4.0	81.7	4.2	85.4
It's wide enough to enjoy activities	3.8	74.2	3.8	74.2	3.8	75.6
For solitude (to be alone)	3.5	60.2	3.5	60.8	3.5	60.8
Little or no cost to enjoy it	3.3	55.6	3.5	63.6	3.1	46.8
It is close to where I stay on my vacation	3.3	55.4	2.9	41.7	3.8	70.7
It is close to my primary residence	3.1	52.8	2.9	45.3	3.3	59.2
There is adequate parking	3.0	44.9	3.2	53.9	2.8	34.8
There are adequate beach rentals and concessions	2.8	37.5	3.0	41.8	2.5	32.2
There are public rest room facilities	2.7	34.8	3.2	52.4	2.0	12.7
To be with a large number of people	1.8	9.8	1.9	13.5	1.6	4.8

* n's are based on average number of responses to each statement.
¹ Rankings are based on a 1-5 scale, with 1 = strongly disagree and 5 = strongly agree.
² Percentages are based on those respondents who "agreed" or "strongly agreed" to statement.

Perceptions and Impacts of Crowding

Those individuals who were interviewed during the on-site part of the study were asked to respond to their perceptions of crowding and how the number of people that were on the beach affected their enjoyment of the beach that day. A nine-point scale was used to estimate crowding with a "1" denoting not at all crowded and a "9" denoting extremely crowded. The average crowd rating was 4.7. This estimate varied between beach communities with Fenwick Island respondents assigning an average rating of 3.2 for crowding and Bethany Beach respondents, on average, rating the crowding at 5.8. Most of the respondents (45%) rated the crowding to be moderate (between 4 and 6); 32 percent rated it not crowded (between 1 and 3); and 23 percent rated the crowding to be heavy (between 7 and 9) (Table 20).

Crowding at Beach*	All (n = 560) (avg. = 4.7)	Rehoboth Beach (n = 128) (avg. = 5.7)	Dewey Beach (n = 118) (avg. = 4.7)	Bethany Beach (n = 115) (avg. = 5.8)	South Bethany (n = 95) (avg. = 3.5)	Fenwick Island (n = 104) (avg. = 3.2)
1-3	32	12	30	11	53	62
4-6	45	47	51	52	37	38
7-9	23	42	20	37	11	1

* Based on 1-9 scale, with 1 = not at all crowded and 9 = extremely crowded.

Even though 68 percent of the on-site respondents rated the crowding to be moderate or heavy, the majority of all beachgoers indicated that this did not have a negative impact on their enjoyment of the beach. Beachgoers were asked whether the number of people on the beach impacted their enjoyment. Again, a nine-point scale was used with a "1" signifying that the number of people increased their enjoyment and a "9" indicating it decreased their enjoyment.

The average crowd impact/enjoyment rating was 4.5. Sixty-five percent of all respondents indicated the number of people on the beach had no effect on their enjoyment (between 4 and 6); 26 percent indicated the number of people increased their enjoyment (between 1 and 3); and 10 percent reported that the number of people decreased their enjoyment (between 7 and 9) (Table 21).

Impact of Crowding on Enjoyment*	All (n = 561) (avg. = 4.5)	Rehoboth Beach (n = 129) (avg. = 4.9)	Dewey Beach (n = 118) (avg. = 4.4)	Bethany Beach (n = 114) (avg. = 5.1)	South Bethany (n = 96) (avg. = 4.0)	Fenwick Island (n = 104) (avg. = 4.0)
1-3	26	19	27	9	40	38
4-6	65	67	64	79	56	57
7-9	10	15	9	12	4	6

* Based on a 1-9 scale, with 1 = increased enjoyment and 9 = decreased enjoyment.

Rating the Beach Experience

On-site respondents were also given the opportunity to rate their overall beach experience on a scale of 1 to 10, with 10 being a perfect experience. It was up to the beachgoers themselves to determine what qualities they wanted to include in arriving at their rating. Overall, on average, respondents rated their beach experience 8.4,

indicating that most thought it was near perfect. Fenwick Island visitors (8.6) had the highest average rating and South Bethany Beach visitors (8.2) the lowest. Twenty-three percent of all respondents rated their beach experience on the day they were interviewed a perfect 10. Fenwick Island beachgoers had the most perfect scores, with 30 percent indicating they were totally satisfied with their day on the beach (Table 22).

Table 22. Beach experience rating by on-site respondents (percent).

Beach Experience Rating*	All (n = 562) (avg. = 8.4)	Rehoboth Beach (n = 129) (avg. = 8.4)	Dewey Beach (n = 118) (avg. = 8.4)	Bethany Beach (n = 115) (avg. = 8.5)	South Bethany (n = 96) (avg. = 8.2)	Fenwick Island (n = 104) (avg. = 8.6)
1	<1	0	0	0	1	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	1	2	1	0	0	1
5	3	2	3	4	2	2
6	2	2	2	1	6	2
7	10	9	7	11	14	9
8	36	37	45	30	32	34
9	25	26	21	33	21	23
10	23	22	21	20	23	30

* Based on a 1-10 scale, with 10 = perfect.

Attitudes toward Beach Management and Sand Replenishment

There were no observed differences between on-site respondents and mail survey respondents with regard to people's understanding of beach management techniques and their attitudes toward sand replenishment, in particular. Using the same five-point scale that was previously discussed, both groups ranked the statement, "a wide sandy beach will protect beachfront property and preserve the coastal economy," the highest (3.9--on-site; 4.0--mail). This was followed by "sand replenishment should be used to maintain wide beaches" (3.8); "if I know the beaches are kept replenished with sand, it would give a sense of security to my family and me" (3.5--on-site; 3.6--mail); and, finally, "jetties, groins, and bulkheads are effective at slowing erosion" (3.4) (Tables 23 and 24).

No differences between on-site respondents in the beach communities were observed with regard to beach management and sand replenishment techniques. In the mail survey, beach users, both non-property owners and property owners, rated almost every statement higher than non-beach users, the one exception being the technique "Jetties, groins, and bulkheads are effective at slowing erosion." Property owners had the least support for this technique at slowing erosion.

Table 23. On-site respondents' understanding of beach management and sand replenishment (rank and percent).

Understanding of Beach Management/ Sand Replenishment	All (n=559)*		Rehoboth Beach (n=128)		Dewey Beach (n=118)		Bethany Beach (n=115)		South Bethany (n=96)		Fenwick Island (n=103)	
	Rank	Percent	Rank	Percent	Rank	Percent	Rank	Percent	Rank	Percent	Rank	Percent
A wide, sandy beach will protect beachfront property and preserve the coastal economy	3.9 ¹	82.5 ²	3.8	82.2	3.9	83.1	3.9	80.0	3.9	83.3	3.9	85.2
Sand replenishment should be used to maintain wide beaches.	3.8	76.6	3.8	79.9	3.8	75.5	3.8	73.1	3.8	77.1	3.8	77.6
If I know beaches are kept replenished with sand, it would give a sense of security to my family and me.	3.5	60.5	3.5	58.4	3.4	55.5	3.5	60.5	3.6	65.2	3.6	55.4
Jetties, groins, and bulkheads are effective at slowing erosion.	3.4	47.8	3.4	45.8	3.3	44.1	3.3	52.1	3.4	46.9	3.3	50.9

- * n's are based on average number of responses to statements.
 1 Rankings are based on a 1-5 scale, with 1 = strongly disagree and 5 = strongly agree.
 2 Percentages are based on those respondents who "agreed" or "strongly agreed" to statement.

Table 24. Mail respondents' understanding of beach management and sand replenishment (rank and percent).

	All (n=323)*		Beach Users				Non-Beach Users (n=43)	
	Rank	Percent	Non-Property Owners (n=138)	Property Owners (n=138)	Non-Property Owners (n=138)	Property Owners (n=138)	Rank	Percent
A wide sandy beach will protect beachfront property and preserve the coastal economy	4.0 ¹	76.7 ²	3.7	67.6	4.4	89.8	3.5	65.8
Sand replenishment should be used to maintain wide beaches	3.8	68.7	3.7	66.2	4.1	77.9	3.2	50.0
If I know the beaches are kept replenished with sand, it would give a sense of security to my family and me	3.6	57.6	3.2	44.2	4.3	81.5	2.8	32.6
Jetties, groins, and bulkheads are effective at slowing erosion	3.4	47.8	3.3	44.1	3.3	40.9	3.3	33.0

- * n's are based on average number of responses to each statement.
 1 Rankings are based on a 1-5 scale, with 1 = strongly disagree and 5 = strongly agree.
 2 Percentages are based on those respondents who "agreed" or "strongly agreed" to statement.

Support for Sand Replenishment Efforts

The questions that sought input on who should pay for sand replenishment also exhibited no significant differences between the two survey groups. Both groups felt that state government (4.1--on-site, 4.0--mail) and local governments--county and coastal towns (4.1--on-site; 4.0--mail)--should be the primary providers of funds to support beach nourishment. Both groups also felt strongly that everyone who uses and benefits from the beach should help support replenishment efforts (3.8--on-site; 4.0--mail). The least-favored option for supporting beach replenishment was the federal government (3.4--on-site; 3.5--mail) (Tables 25 and 26).

There were no observed differences between beach communities and respondents' support for sand replenishment in the on-site component of the study (Table 25). Beach property owners had a much stronger feeling about issues related to financially supporting beach replenishment efforts than did both non-property owners and non-beach users in the mail survey (Table 26).

	All (n=561)*		Rehoboth Beach (n=129)		Dewey Beach (n=118)		Bethany Beach (n=115)		South Bethany (n=96)		Fenwick Island (n=104)	
State government should help support sand replenishment of Delaware's public beaches.	4.1 ¹	89.4 ²	4.0	86.8	4.0	86.4	4.1	92.2	4.1	89.6	4.1	92.3
Local government (county and coastal towns) should help support sand replenishment of Delaware's public beaches.	4.1	89.3	4.1	89.9	4.1	87.3	4.1	90.4	4.1	89.6	4.0	89.4
Everyone who uses or benefits from the beach should help support beach replenishment efforts.	3.8	76.7	3.6	71.6	3.7	75.2	3.9	81.8	3.8	77.1	3.8	78.8
The federal government should help support sand replenishment of Delaware's public beaches.	3.4	57.2	3.3	54.3	3.4	60.2	3.4	54.0	3.5	58.4	3.5	59.2
* n's are based on average number of responses to all statements. 1 Rankings are based on a 1-5 scale, with 1 = strongly disagree and 5 = strongly agree. 2 Percentages are based on those respondents who "agreed" or "strongly agreed" to statement.												

Table 26. Mail respondents' support for sand replenishment of Delaware's beaches (rank and percent).									
	All (n = 323)*		Beach Users				Non-Beach Users (n = 43)		
			Non-Property Owners (n = 138)		Property Owners (n = 138)				
State government should help support sand replenishment of Delaware's public beaches	4.0	80.4	3.7	72.2	4.5	90.8	3.7	72.1	
Everyone who uses or benefits from the beach should help support beach replenishment efforts	4.0	79.3	3.8	73.3	4.3	86.0	3.7	76.7	
Local government (e.g., the county and coastal towns) should help support sand replenishment of Delaware's public beaches	4.0	78.6	3.8	73.2	4.3	88.2	3.6	72.1	
The federal government should help support sand replenishment of Delaware's public beaches	3.5	58.5	3.3	51.8	4.1	73.1	2.6	34.1	
<p>* n's are based on average number of responses to each statement.</p> <p>1 Rankings are based on a 1-5 scale, with 1 = strongly disagree and 5 = strongly agree.</p> <p>2 Percentages are based on those respondents who "agreed" or "strongly agreed" to statement.</p>									

WILLINGNESS TO PAY

On-site Respondents

On-site beach users were asked two specific questions related to whether they would pay a daily fee to use the beach they were currently visiting. The first question asked if they would be willing to pay a specified amount (between \$1 and \$5) per person to use the beach they were using on the day they were interviewed. Bidded amounts were randomly assigned during each daily interviewing schedule.

If the beach users responded either affirmatively or negatively to the bidded amount, they were next instructed to state the maximum amount they would be willing to pay. Respondents could then provide an amount they felt they would pay (if different from the bidded figure they were assigned) or respond that they would be willing to pay nothing.

Seventy-seven percent of the on-site respondents were willing to pay some amount per day to use the beach (ranging between \$.01 and \$25.00). The mean willingness to pay for a day on the beach in its existing state (without sand replenishment) was \$3.01

(Table 27). This average amount represents all respondents, including those who answered they would pay nothing.

Overall, for those who were not willing to pay a daily amount for using a Delaware ocean beach, the following reasons were mentioned: already pay through other means (61%); objected to daily per person user fee method (13%); did not want to place a dollar value on the experience (9%); not enough information (3%); that is what beach is worth (2%); objected to the way the question was presented (1%); and "other" reasons (12%).

Those respondents who were willing to pay a certain amount to use a Delaware beach were asked whether the number of trips they typically make to the beach would change if a daily fee was involved. Seventy-six percent of the respondents indicated that they would visit the beach as often as they currently do if a daily fee system was instituted (Table 27). The remaining 24 percent mentioned that they would go to the beach fewer times if a fee was imposed. Most of these respondents stated that they would make between one-third and one-half of the number of visits they currently make to the beach if such a fee were charged.

The second question that was asked sought to gain insight into what beachgoers would be willing to pay for an enhanced beach (with sand replenishment to widen the existing beach). Two colored 8" x 10" photographs were shown to each beach user. One photo revealed an eroded beach with little dry sand between beach users and the water; the second photo was of the same beach area after the beach had been replenished and widened with sand.

Respondents were asked whether they would be willing to pay more than the previous amount they had reported if the beach they were using was widened like in the replenished beach photo. Thirty percent of all the beach users indicated they were willing to pay more for the wider beach (Table 27). The willingness to pay for a day's use of the replenished beach ranged between \$0.01 and \$35.00 and averaged \$3.70, or \$0.69 more than for the existing beach. These amounts again represent all of the respondents, including those who answered they would pay nothing. The reasons individuals gave for not paying were quite varied. They included comments such as "beach width is not important," "already pay through taxes or other means," and "sand replenishment doesn't work." (See Appendix C for additional comments.)

Respondents were also asked how the number of visits they typically make to the beach would be affected if a user fee in the amount they reported for the wider ocean beach was implemented (Table 27). As in the case of the earlier question about the existing beach, most respondents (68%) stated that it would make no difference. About one-third (31%) reported that they would make fewer trips than now if the higher fee for the wider beach was imposed (compared to 24% if a fee were required for the existing beach).

Table 27. On-site respondents' willingness to pay for using current Delaware beaches, for wider beaches, and for annual beach protection fund.						
	All (n = 562)	Rehoboth Beach (n = 129)	Dewey Beach (n = 118)	Bethany Beach (n = 115)	South Bethany (n = 96)	Fenwick Island (n = 104)
Percent willing to pay some amount to use Delaware ocean beaches	77	80	79	75	74	78
Average amount willing to pay to use Delaware ocean beaches (zero amounts included)	\$3.01	\$3.22	\$3.21	\$2.73	\$2.59	\$3.20
How would fee affect number of visits typically made?						
More	0	0	0	0	0	0
Same	76	85	72	74	73	70
Fewer	24	15	28	26	27	30
Percent willing to pay more for wider beach	30	29	35	25	23	38
Average amount willing to pay for wider beach (zero amounts included)	\$3.70	\$3.90	\$3.99	\$3.36	\$3.12	\$4.02
How would wider beach fee affect number of visits typically made?						
More	1	4	0	0	0	2
Same	68	78	68	60	63	64
Fewer	31	18	32	40	37	34
Percent willing to contribute to annual beach protection fund	79	77	78	73	81	81
Average annual amount willing to pay to fund (zero amounts included)	\$63.69	\$55.34	\$42.40	\$95.44	\$65.59	\$61.42
Range of annual contribution to fund	\$3-2,500	\$3-500	\$3-300	\$5-2,500	\$10-500	\$5-500

As an additional payment vehicle, on-site visitors were asked whether they would contribute to an annual beach protection fund that would insure the beaches would be maintained for their use as well as for future generations. They were also informed that this contribution would be in addition to any daily user fees they might pay and that it would be voluntary. Approximately 79 percent of all respondents were willing to pay some annual amount ranging between \$3.00 and \$2,500 for long-term beach protection (Table 27). The reasons mentioned by the remaining 21 percent of respondents who said they would not contribute to the fund included the following: already pay through other means (34%); not enough information (11%); objected to the annual contribution method of payment (8%); objected to the way question was presented (4%); did not want to place a dollar value on that type of protection (3%); that is what the beach is worth (1%); and "other" reasons for not contributing to the fund (40%). (See Appendix E for additional comments.) The average amount respondents would contribute to the hypothetical annual fund was \$63.69 when all responses (including zeros) are considered.

Beyond the overall response patterns discussed above, Table 27 also summarizes responses to the willingness-to-pay questions for individuals sampled at each of the five Delaware beach communities. There were some slight variations in responses to certain questions across beach locations. For example, while most beach users (74 to 80%) were willing to pay something at each of the Delaware beaches, the average amounts they were willing to pay for the existing beach were noticeably lower at South Bethany (\$2.59) and Bethany Beach (\$2.73) than at the other three locations (\$3.20 to \$3.22). The same pattern held true for the willingness to pay for the replenished beach; average values were lowest for Bethany and South Bethany beaches. In all cases, however, beach users were willing to pay at least \$0.50 more for a day at a replenished beach compared to the existing beach, with the lowest difference (\$0.53) at South Bethany and the greatest difference (\$0.82) at Fenwick Island. Similarly, most beach users (73 to 81%) were willing to contribute something to the hypothetical beach protection fund. The average amounts respondents were willing to pay ranged from \$42.40 for those at Dewey Beach to \$95.44 for those at Bethany Beach.

As a final step in the analysis of willingness to pay for Delaware ocean beaches, comparisons were made to test for the existence of certain potential biases that could affect the results. More specifically, the willingness-to-pay measures were examined in relation to respondents' income and the amount of the starting bid. In addition, the potential influence of extreme values ("outliers") and "protest bids" were considered.

Analysis of responses by income category showed no significant difference across income levels for any of the three willingness-to-pay measures. Thus, willingness to pay for Delaware beaches was not a function of respondents' income levels. Similarly, analysis by the amount of the initial bid showed that although the average willingness to pay was higher when the bidden amount was higher, there was no statistically significant impact of the starting point on the final willingness to pay (Table 28). In other words, the mean willingness-to-pay values shown in Table 28 were not significantly different from each other.

Bid Amount	No. Asked	Percent Willing to Pay Bid Amount	Mean Willingness to Pay (\$)
\$1.00	112	81	\$2.87
2.00	112	64	2.60
3.00	113	49	2.95
4.00	113	40	3.04
5.00	112	46	3.57

Because the average willingness-to-pay estimates can be influenced by extreme values, it is instructive to look at these measures while adjusting for such values (Table 29). As noted earlier, the average amount respondents were willing to pay for a day at the existing beach was \$3.01 per person. Nearly all responses were between zero and \$10.00. Seven individuals, however, reported higher amounts of \$15.00 (2), \$20.00 (4), and \$25.00 (1). If these "outliers" are removed from the calculation, the average amount people are willing to pay drops to \$2.80 (Table 29).

Willingness-to-Pay Measure	Overall Average	Normal Range of Responses	Average with Outliers Removed	Average with Protest Bids Removed
Daily Fee for Natural Beach	\$3.01	\$0-\$10.00	\$2.80	\$3.85
Daily Fee for Enhanced Beach	\$3.70	\$0-\$15.00	\$3.46	\$4.63
Voluntary Beach Protection Fund	\$63.69	\$0-\$500.00	\$55.74	\$78.65

On the other hand, most of the zero values volunteered by respondents were "protest bids" in the sense that they did not represent what the individuals felt the resource was worth, but rather were the respondents' way of objecting to either the idea of charging fees or the specific details of the question. If these protest bids are removed from the calculation, the average willingness to pay for a day at the beach increases to \$3.85 (Table 29).

Similarly, the "normal range" of responses to the value of a day at the enhanced beach was between zero and \$15.00. Seven individuals reported higher values (six at

\$20.00 and one at \$35.00). If these values are considered outliers and removed from the computation, the average willingness to pay for the enhanced beach drops to \$3.46. If the zero bids interpreted as protest bids are deleted, the willingness to pay for the replenished beach increases to \$4.63, or \$0.78 higher than the corresponding adjusted willingness to pay for the natural beach.

Finally, similar adjustments were made relative to the willingness-to-pay values for the hypothetical beach protection fund. The "normal range" of responses was between zero and \$500.00, with only two higher values (one at \$2,000 and one at \$2,500). The average contribution respondents were willing to make to such a fund (\$63.69 for all individuals) decreases to \$55.74 with the two outliers removed, but increases to \$78.65 with the protest bids deleted from the calculation (Table 29). As in the case of the other willingness-to-pay measures, these adjusted values give a better perspective on the amounts people are willing to pay and may represent a reasonable range of estimates for the various measures.

Further multiple regression analyses were conducted to determine what combinations of variables were related to subjects' willingness to pay for Delaware's ocean beaches. Because of the complexity of these analyses, these results are presented in Appendix B.

Mail Survey Respondents

Mail survey respondents were also asked whether they would be willing to pay a daily fee to use a Delaware ocean beach. User fee bid amounts ranging from \$1 to \$5 were presented to mail survey recipients. If they accepted or rejected the bid amount, they were then given the option of providing the maximum that they would be willing to pay to use a Delaware beach for a day.

Fifty-two percent of the overall sample were willing to pay the bidden amount that they were presented with, and 76 percent of the respondents indicated that they would pay some amount to use a Delaware ocean beach (Table 30). The overall sample of respondents was willing to pay an average of \$2.85 (with zero amounts included) per person per day to use Delaware beaches. Eighty-three percent of the respondents who were willing to pay indicated they would take the same number of trips to Delaware ocean beaches if they had to pay for their use, while 14 percent said that they would take fewer trips and 3 percent indicated they would make more visits (Table 30).

For those not willing to pay any amount for using the beach, the most reported reason was that they already pay through other means (46%). Fifteen percent objected to the daily per person payment method, 9 percent felt there was not enough information to make their decision, 6 percent objected to the way the question was presented, 4 percent did not want to place a dollar value on the experience, and 2 percent stated that is what the beach is worth, and 18 percent suggested various "other reasons" why they would not be willing to pay.

Table 30. Mail respondents' willingness to pay for using current Delaware beaches, for wider beaches, and for annual beach protection fund.

	All (n=348)	Beach Users		Non-Beach Users (n=46)
		Non-Property Owners (n=150)	Property Owners (n=141)	
Percent willing to pay some amount to use Delaware ocean beaches	76	81	74	74
Average amount willing to pay to use Delaware ocean beaches (zero amounts included)	\$2.85	\$2.79	\$2.97	\$3.10
How would fee affect number of visits typically made?				
More	3	1	3	14
Same	83	84	79	86
Fewer	14	15	18	0
Percent willing to pay more for wider beach	21	13	30	23
Average amount willing to pay for wider beach (zero amounts included)	\$3.50	\$3.23	\$3.98	\$3.77
How would wider beach fee affect number of visits typically made?				
More	11	0	17	20
Same	77	80	74	80
Fewer	12	20	9	0
Percent willing to contribute to annual beach protection fund	34	31	42	23
Average annual amount willing to pay to fund (zero amounts included)	\$26.60	\$10.99	\$51.64	\$4.93
Range of annual contribution to fund	\$1-1,000.00	\$5-200.00	\$1-1,000.00	\$1-50.00

Twenty-one percent of the overall respondents indicated that they would be willing to pay more for a wider beach. The average amount they were willing to pay was \$3.50 (with zero amounts included), or \$0.65 more than for the natural beach. Those individuals who were not willing to pay more for a wider beach mentioned a variety of reasons for not doing so. They included such comments as "don't visit the beach often enough," "beach width is not important," and "already pay to use the beach." (See

Appendix D for additional comments.) Twelve percent of the respondents noted that they would make fewer visits with a widened beach, and 11 percent indicated that they would make more visits. Seventy-seven percent indicated they would make the same number of visits that they typically make if the user fee for the wider beach was imposed.

When mail respondents were asked whether they would contribute to an annual voluntary beach protection fund to insure that Delaware beaches are protected against erosion, 34 percent were willing to contribute to the fund (ranging from \$1.00 to \$1,000.00). The average amounts of the contribution, including those who said they would pay nothing, was \$26.60 for the overall mail sample. The 66 percent of the sample who were unwilling to contribute offered the following reasons: already pay through other means (32%); there was not enough information to make a decision (14%), did not want to place a dollar value on that type of protection (14%); objected to the annual contribution method of payment (9%); objected to the way the questions were presented (5%); that is what the beach is worth (3%); and other reasons for not contributing to the fund (24%). (See Appendix F for additional comments.)

Only slight differences were observed between the various segments of mail survey respondents with regard to their willingness to pay some amount to use a Delaware ocean beach. It is understandable that non-property owning beach users (81%) and those beach users who owned property (74%) would be willing to pay for using the beaches, but 74 percent of non-beach users were also willing to pay some amount per day to use Delaware beaches. In addition the non-beach users' (\$3.10) willingness to pay for a day on a Delaware beach was slightly higher than both beach user groups (\$2.79--non-property owners; \$2.97--property owners). More than three-quarters of all the groups (79%-86%) indicated that they would make the same number of visits to a Delaware ocean beach if they had to pay to use it. Fourteen percent of non-beach users, however, indicated that they would make more visits if a fee were imposed compared to only 1 percent of non-property owners and 3 percent of property owners (Table 30).

Non-beach users were more varied in their responses as to why they would not pay for using a Delaware ocean beach. The responses, "already pay through other means" and "objected to the daily per person payment method," were both mentioned by 21 percent of the non-beach users. Sixteen percent mentioned that they did not have enough information and 11 percent each mentioned that they did not want to place a dollar value on the experience or they felt that was what the beach experience was worth to them. Sixteen percent mentioned other reasons for being not willing to pay.

Only 13 percent of the non-property owners indicated that they would pay some additional amount for a wider beach. This was considerably lower than both property owners and (30%) and non-beach users (23%). They also indicated they would pay less on average for a wider beach than the two other groups (\$3.23 vs. \$3.98--property owners and \$3.77--non-beach users). Eighty percent of both non-property owners and non-beach users indicated that they would visit the beach the same number of times that they

currently do if they had to pay for a wider beach, versus 74 percent of property owners. If fees were imposed for a wider beach, non-property owners were the only group where none indicated they would visit the beach more than they typically do. In comparison, 17 percent of property owners and 20 percent of non-beach users reported that they would visit the beach more often than they typically do.

Beach property owners also reported the greatest difference in willingness to pay for the widened beach versus the natural beach. The average amount they were willing to pay for the replenished beach (\$3.98) was about a dollar (\$1.01) more than the amount they would pay for the natural beach (\$2.97). The corresponding differences for non-property owners and non-beach users were \$0.44 and \$0.67, respectively (Table 30). These differences likely reflect the investment that beach property owners have in their properties, and the corresponding willingness to contribute to beach enhancements and protection efforts.

Beach users who did not own coastal property were more likely than non-users to support the hypothetical annual beach protection fund (31% willing to contribute an average of \$10.93 vs. 23% willing to contribute an average of \$4.93). Those who did own beach property, however, were much more likely to agree to contribute to the beach protection fund. Forty-two percent of the beach property owners were willing to contribute an average of \$51.64 toward the fund.

An analysis similar to that conducted for on-site respondents was also performed for mail survey respondents to note whether responses differed based on the amount of the initial bids. The percent of mail respondents willing to pay decreased as bid amounts increased and the average dollar amount they were willing to pay was higher when the bid amount was higher. Like on-site respondents, however, there was no statistically significant impact of the starting point bid on the final willing-to-pay values (Table 31).

Bid Amount	No. Asked	Percent Willing to Pay Bid Amount	Mean Willingness to Pay (\$)
\$1.00	75	69	\$2.27
2.00	73	53	2.61
3.00	63	55	3.20
4.00	68	39	2.90
5.00	69	40	3.32

As was done for the on-site survey data, the willingness-to-pay values for the mail survey were adjusted for outliers and protest bids. There were only three outliers above the normal range of zero to \$10.00 for the daily fee for the natural beach (two at \$20.00 and one at \$25.00). With these extreme values removed, the average willingness-to-pay amount decreased from \$2.85 to \$2.64 (Table 32). If the protest bids (all zero values except for the 2 percent who indicated that the beach had no value to them) are discarded, the average willingness to pay for a day at the beach increases to \$3.66.

Willingness-to-Pay Measure	Overall Average	Normal Range of Responses	Average with Outliers Removed	Average with Protest Bids Removed
Daily Fee for Natural Beach	\$2.85	\$0-\$10.00	\$2.64	\$3.66
Daily Fee for Enhanced Beach	\$3.50	\$0-\$15.00	\$3.24	\$4.29
Voluntary Beach Protection Fund	\$26.60	\$0-\$500.00	\$23.75	\$44.55

There were three outliers above \$15.00 for the willingness to pay for the enhanced beach (two at \$20.00 and one at \$30.00). With these outliers deleted, the average willingness to pay for the enhanced beach dropped from \$3.50 to \$3.24 (Table 32). In contrast, if the zero protest bids are deleted from the calculations, the willingness to pay for the replenished beach increases to \$4.29, or \$0.63 higher than the corresponding willingness to pay for the natural beach.

There was only one outlier (\$1,000.00) above the normal range of \$0 to \$500.00 among mail survey respondents for the hypothetical beach protection fund. With this value deleted, the average contribution drops from \$26.60 to \$23.75 (Table 32). When protest bids are deleted from the annual beach fund calculation, the overall average contribution increases to \$44.55. Again, the range of values for both the daily and annual payment mechanisms represents minimum and maximum estimates of the sample's willingness to pay for Delaware's ocean beaches.

CONCLUSIONS

This study examined the characteristics, behaviors, and attitudes among a broad cross-section of Delaware ocean beach users, as well as a segment of the population who has never visited a Delaware coastal beach. Based on a sample of individuals surveyed at five Delaware beach communities, Delaware beach users are primarily out-of-state visitors from Pennsylvania or Maryland who are on short vacations of one week or less. Most beach users visit a Delaware beach every year. They visit the beaches in groups, averaging 4.4 people and typically spend about 4.7 hours on the beach.

Beach visitors primarily select beaches to visit because of the scenery they offer, for the opportunity to engage in beach activities, to socialize with family and friends, and because municipalities keep the beaches clean and attractive. Factors that were less important included being with a large number of people and the availability of public rest rooms and parking facilities. The width of the beach was a moderately important factor among the various reasons for selecting a Delaware beach.

The majority of all respondents seemed to support sand replenishment efforts, but only about half felt that jetties, groins, and bulkheads are effective at slowing erosion. There was strong sentiment expressed that sand replenishment should be paid for by state and local government agencies, and less support for the federal government helping to pay for sand replenishment of Delaware's beaches. Most respondents agreed that everyone who uses or benefits from the beaches (those benefiting might include property owners or business owners located within the beach community) should help support beach replenishment efforts.

The major focus of the study was to determine economic values for individuals' use and enjoyment of Delaware's public ocean beaches. Although Delaware beach users currently pay no direct fees to use the beach, about three-fourths of all beach users surveyed indicated they would pay some amount (responses ranged from a low of .25/day to \$25.00/day). This was a new concept to many beachgoers, and others attempted to relate it to the beach fee system currently in operation on New Jersey beaches. A key element, however, in presenting this question to beachgoers was in trying to have them place a dollar value on what their beach experience was worth and not actually thinking about paying a "user fee" each time they visited an ocean beach. Both on-site visitors and mail survey respondents indicated that they would be willing to pay about \$3.00 per person for a day at the beach. Most respondents stated that the number of visits they make to the beach would not change if a daily user fee was implemented. Nearly all the respondents who were not willing to pay anything were classified as "protest bids," reflecting their lack of information about, or opposition to, the question rather than the value they actually attached to the beach.

A second key concept in administering the study was in trying to have respondents visualize what a replenished beach would look like. This was important since a second willingness-to-pay question sought their comments on paying additional fees for the widened beach. For on-site respondents, the approach employed was to have them visualize the beach they were currently using being widened, with the width being similar to a colored photograph they were shown and asking them what value they attached to it. About one-third of the on-site respondents indicated they were willing to pay more for a beach that had been widened with sand. Mail survey respondents had a somewhat more difficult time visualizing a widened beach since they were being asked to react to a smaller black-and-white photograph of a widened beach. Slightly more than one-fifth of mail respondents indicated that they would pay more for a wider beach. In both cases, the amount people were willing to pay showed an average increase of 23 percent over the amount they would pay for a natural beach.

A third area where economic input was solicited was in asking survey respondents if they would be willing to contribute to an annual beach protection fund. This concept was also difficult for some people since the question asked if they would contribute to the fund even if they never used the beach. This approach attempted to see whether individuals were willing to contribute financially "just to know the beaches would be maintained for their future use or future generations' use" (in economic terms this is known as existence value). There was a noteworthy difference between the on-site and mail survey respondents in their willingness to contribute to an annual beach protection fund. Approximately three-fourths of the on-site visitors were willing to contribute something to the fund, while only about one-third of the mail survey respondents were willing to do so.

It is conceivable that those who had never visited a Delaware ocean beach were less likely to respond to the mail survey. However, a sample of 46 non-users did respond and provided a somewhat different perspective of the data than did the sample of beach users. The non-users were less likely to feel that sand replenishment should be used to maintain wide beaches. Only one-half of the non-users agreed with this statement compared with three-quarters of the beach users who owned property and two-thirds of the non-property beach users.

Beach users and non-users alike generally agreed that the costs of sand replenishment should be supported mainly by state and local government agencies and by everyone who uses or benefits from the beach. The non-users were much less likely to feel that the federal government should help support sand replenishment of Delaware's public beaches. Only one-third of them voiced support for this option, whereas one-half of the non-property owners and almost three-quarters of the property owners felt that the federal government had a role in helping to replenish the state's beaches.

When beach users and non-beach users were asked whether they would be willing to pay for a day at the beach, there were no significant differences in the amounts they

would pay for either the existing beach or an enhanced beach. Both groups were willing to pay more for a beach with sand replenishment when the payment vehicle was a hypothetical daily beach user fee. However, non-users were much less likely to contribute to an annual beach protection fund, again reflecting less of a vested interest in Delaware's beaches. These data reinforce the idea that enhanced beaches are worth more than unnourished beaches, but the costs of sand replenishment should be borne primarily by those who use and benefit from them.

The information presented in this report provides one small picture in the total feasibility analysis that will help the U.S. Army Corps of Engineers make decisions concerning future shoreline protection options for Delaware's public ocean beaches. When the willingness-to-pay responses of both beach users and non-users are tabulated and summarized, there appears to be a positive "consumer surplus" (an economic term that calculates the net benefits between an existing beach's value and the value it provides if it is replenished with sand). When the values of these recreation benefits are included in the total set of shoreline benefits (e.g., residential property values, value to businesses, etc.) and weighed against the total costs of the overall project, a cost-to-benefit ratio can be estimated. This final cost-benefit analysis will ultimately play a part in the U.S. Army Corps of Engineers' commitment to long-term enhancement and maintenance of Delaware's public beaches.

APPENDIX A

**ANALYSIS OF RESPONSES BY
DELAWARE RESIDENTS VERSUS NON-DELAWAREANS**

Introduction

Comparisons were made between Delaware residents and out-of-state respondents for both the on-site and mail components of the study. Most of the comparisons exhibited little difference between the two groups. However, Delaware residents (34 days/year--on-site; 42 days/year--mail) were inclined to use the beaches more frequently than non-residents (13 days/year--on-site; 2 days/year--mail) by a wide margin.

When demographic differences were examined, Delaware residents were slightly older (mail respondents only); and residents in the on-site survey had lower incomes and education levels than non-residents.

When beach attribute comparisons were analyzed, they were generally the same. A few significant differences were detected with regard to "being close to home" where residents (4.4--on-site; 3.4--mail) exhibited a higher rating than non-residents (4.1--on-site; 2.4--mail). "Being with a large number of people" was more important for residents responding in the on-site survey (2.4 vs. 2.2); non-residents in the mail survey indicated that the "availability of rest room facilities" (3.1 vs. 2.5) held greater importance.

Delaware residents were consistently more favorable toward the statements about beach management and sand replenishment, especially in the mail survey. Mail survey residents felt more strongly that sand replenishment should be used to maintain wide beaches (4.0 vs. 3.5); that a wide beach protects beachfront property and preserves the coastal economy (4.1 vs. 3.6), and sand replenishment provides security to their families (3.9 vs. 3.0).

Residents in the mail survey also felt more strongly that federal (3.9 vs. 2.8), state (4.2 vs. 3.6), and local (4.1 vs. 3.6) governments should help support sand replenishment. They also had stronger feelings than non-residents that everyone who uses or benefits from the beach should help support sand replenishment (4.2 vs. 3.7). Residents (3.7) surveyed on-site had stronger feeling about the federal government's role in helping support sand replenishment than did non-residents (3.4) surveyed in the field.

Willingness to Pay: On-Site Respondents

More significant differences between Delaware residents and out-of-staters were found with regard to their willingness to pay for using Delaware's ocean beaches. When the willingness-to-pay estimates are broken down by state of residence (Delaware residents versus non-Delawareans), the results indicate that out-of-state visitors (\$3.16 and \$3.88) were willing to pay more than Delaware residents (\$2.20 and \$2.72) for a day at the beach, both with and without an enhanced beach (Table A-1). Both residents and visitors were willing to pay significantly more for an enhanced beach. The difference in willingness to pay between the "with project" and "without project" amounts, however, did not differ significantly between residents (\$0.52) and non-residents (\$0.72).

On-site visitors were also asked whether they would contribute to an annual beach protection fund that would insure the beaches would be maintained for their use, as well as that of future generations. They were also reminded that this contribution would be in addition to any daily user fees that they might pay and that it would be voluntary. In contrast, Delaware residents were willing to pay much more for the hypothetical annual beach protection fund than non-residents (\$125.39 versus \$51.67 with \$0 responses also included).

Table A-1. Average amounts that Delaware residents and out-of-state visitors are willing to contribute to beach nourishment (on-site survey respondents).

	Delaware Residents			Out-of-State Visitors			F-Value	Level of Significance
	n	Mean (\$)	Standard Deviation (\$)	n	Mean (\$)	Standard Deviation (\$)		
Willingness to pay--without beach nourishment	91	2.20	2.49	469	3.16	3.30	6.9	.0087
Willingness to pay--with beach nourishment	90	2.72	2.90	470	3.88	4.02	6.9	.0089
Willingness to contribute to annual beach protection fund	90	125.39	342.84	462	51.67	81.59	16.6	.0001

Willingness to Pay: Mail Respondents

When willingness-to-pay estimates are examined for Delaware residents and non-residents, the results show that those individuals living in other states (\$3.46) were again willing to pay more than Delaware residents (\$2.45) for a day at the beach in its current condition. While non-residents were also willing to pay more for an enhanced beach (\$3.86 versus \$3.25), this difference was small and not statistically significant (Table A-2). The difference between "with project" and "without project" amounts did differ significantly between residents and non-residents, with Delawareans' willingness to pay for an enhanced beach increasing more (\$0.80 vs. \$0.40). The increased amount that residents were willing to pay for the enhanced beach was twice as much as what non-residents were willing to pay.

Similar to the on-site data, Delaware residents were willing to contribute much more to the hypothetical beach fund than non-residents (\$37.50 versus \$5.55 with \$0 amounts included). However, these amounts are substantially less than what the on-site respondents indicated they would contribute (Table A-2).

Table A-2. Average amounts that Delaware residents and out-of-state visitors are willing to contribute to beach nourishment (mail survey respondents).

	Delaware Residents			Out-of-State Visitors			F-Value	Level of Significance
	n	Mean (\$)	Standard Deviation (\$)	n	Mean (\$)	Standard Deviation (\$)		
Willingness to pay--without beach nourishment	173	2.45	2.99	110	3.46	3.65	6.5	.011
Willingness to pay--with beach nourishment	137	3.25	3.20	97	3.86	3.85	1.4	.230
Willingness to contribute to annual beach protection fund	226	37.50	98.97	117	5.55	14.10	12.0	.0006

APPENDIX B

**REGRESSION ANALYSIS:
ESTIMATING BID FUNCTIONS FOR
ON-SITE AND MAIL SURVEY RESPONDENTS**

Introduction

This appendix presents the results of a multiple regression analysis conducted to determine what variables could be used to predict or explain people's willingness to pay for beach recreation and enhancement efforts. The results are presented in separate sections for the on-site and mail survey components of the study because of the differing nature of the two samples and survey instruments. The on-site survey included only beach users sampled at five Delaware beach communities, and the personal interview instrument used included more potential predictor variables detailing the respondents' beach use patterns (e.g., group size) and perceptions (e.g., perceived crowding and satisfaction). The mail survey included both beach users and non-users, since part of the sample was drawn from the general population within several surrounding Mid-Atlantic states.

On-Site Respondents

Separate regression analyses were performed for each of the willingness-to-pay measures (pay daily fee for existing beach, pay daily fee for enhanced beach, contribute to voluntary annual beach fund) as dependent variables. Independent (or predictor) variables that were considered included the complete pool of demographic, beach use, and attitudinal variables which comprised the survey instrument. Step-wise regression was selected because of the exploratory nature of the analysis.

A stronger model was found for the annual beach protection fund variable than for the two daily fee payment vehicles. Twenty-eight percent of the variance in the annual beach fund measure was accounted for by four variables (the number of days spent per year on Delaware ocean beaches, the importance of choosing a beach with little or no cost [inverse relationship], importance of a beach offering solitude, and a 10-point rating for overall beach quality) (Table B-1). Thus, beach users willing to contribute more to a voluntary annual beach protection fund tended to be those who spent more days on the beach, those who attached less importance to selecting a beach with little or no cost, those who placed more value on solitude, and those who gave the beach they visited a higher quality rating.

The number of days spent on the beach each year played a much stronger role in the regression model than the other significant variables. This makes sense since it is logical that those who use a beach more would contribute more to a fund dedicated to preserving the beach. The opposite was found in the regression models for the daily fee payment vehicles (Tables B-2 and B-3). Beach users reporting that they spent more days on the beach were willing to pay a lower daily cost to use the beach. This, again, is not surprising since frequent beach users would be particularly impacted by such a payment vehicle and would likely seek out alternative means of access if daily user fees exceeded the amounts they were willing to pay.

Table B-1. Significant variables based on regression analysis for annual beach protection fund contribution (dependent variable).			
Independent Variables	B	Beta	Level of Significance
Number of days spent per year on Delaware ocean beaches.	3.5	.48	.0000
Importance of choosing a beach with little or no cost.	-18.6	-.13	.0056
Importance of beach for solitude.	15.8	.11	.0252
10-point rating for overall beach quality.	13.8	.11	.0263
Constant	-77.4		
R Square = .28			

Table B-2. Significant variables based on regression analysis for willingness to pay without beach nourishment (dependent variable).			
Independent Variables	B	Beta	Level of Significance
Number of days spent per year on Delaware ocean beaches.	-2.4	-.16	.0030
Importance of choosing a beach with little or no cost.	-41.2	-.15	.0090
Importance of beach being close to home or where I stay.	-36.9	-.12	.0300
Day or overnight visitor to beach area.	-165.8	-.15	.0090
Constant	973.7		
R Square = .09			

Table B-3. Significant variables based on regression analysis for willingness to pay with beach nourishment (dependent variable).			
Independent Variables	B	Beta	Level of Significance
Number of days spent per year on Delaware ocean beaches.	-2.9	-.15	.0050
Importance of choosing a beach with little or no cost.	-58.5	-.17	.0020
Marital status of beach visitors.	107.6	.11	.0360
Day or overnight visitor to beach area.	-179.6	-.13	.0170
Constant	863.7		
R Square = .08			

Mail Respondents

A similar analysis was conducted for the mail survey data set. The key difference here is that the respondents included non-beach users as well as Delaware beach users. Separate regressions were again performed for each of the willingness-to-pay measures (pay for existing beach, pay for enhanced beach, contribute to annual beach fund). These were used as the dependent variables and the full pool of potential explanatory variables available from the mail questionnaire were used as independent variables. Step-wise regression was selected because of the exploratory nature of the analysis. A stronger model was again found for the annual beach protection fund variable than for the two measures of willingness to pay for a day at the beach. Sixteen percent of the variance in the beach fund measure was accounted for by two variables (the number of days spent per year on Delaware ocean beaches and owning coastal property). Frequent beach users and those owning coastal property would contribute more to an annual beach protection fund (Table B-4).

Table B-4. Significant variables based on regression analysis for annual beach protection fund contribution (dependent variable).			
Independent Variables	B	Beta	Level of Significance
Number of days spent per year on Delaware ocean beaches.	.26	.23	.0025
Coastal property ownership.	38.4	.26	.0006
Constant	-31.3		
R Square = .16			

These same two variables did not contribute to the explanation of the two daily willingness-to-pay measures (Tables B-5 and B-6). The only variables that contributed to predicting the amounts mail survey respondents were willing to pay for daily beach user fees were two beach attribute importance ratings. The importance of adequate concessions and rentals helped explain willingness to pay for a day at both the natural beach and the enhanced beach. Since this was a negative relationship, those placing less value on concessions and rentals would pay more for a day at the beach. The second predictor variable differed for the natural and enhanced beach models. For the natural beach (Table B-5), willingness to pay a daily user fee was greater for those attaching more importance to public rest room facilities. It is logical that people would pay more for a beach offering rest rooms than for a beach with no such facilities. For the enhanced beach (Table B-6), the importance of solitude was the second significant predictor variable. Those seeking solitude would pay more for a day at the enhanced beach, which makes sense since beach nourishment would increase the space available and the resulting sense of solitude on the beach.

Table B-5. Significant variables based on regression analysis for willingness to pay without beach nourishment (dependent variable).			
Independent Variables	B	Beta	Level of Significance
Importance of adequate concession and rentals on beach.	-91.1	-.42	.0030
Importance of public rest room facilities on beach.	63.7	.29	.0350
Constant	360.5		
R Square = .06			

Table B-6. Significant variables based on regression analysis for willingness to pay with beach nourishment (dependent variable).			
Independent Variables	B	Beta	Level of Significance
Importance of adequate concession and rentals on beach.	-77.8	-.31	.0020
Importance of beach for solitude.	53.3	.23	.0190
Constant	385.7		
R Square = .08			

Summary

The multiple-regression analyses suggest several points about people's willingness to pay for beach recreation and protection efforts. First, the frequency of using the beach influences willingness-to-pay bids, but in different ways for different payment vehicles. Regression models for both the on-site and mail survey data verified that people who use the beach more would contribute more to a voluntary beach protection fund. On the other hand, frequent beach users in the on-site survey would pay less for a daily beach user fee. Both of these findings reflect what one would expect to be the beach users' natural response based on protecting their interests and minimizing the impact on their participation. Second, coastal property ownership emerged as a strong predictor in the mail survey, which was designed to ensure adequate representation of property owners in the sample. Again, the effect is as expected, with property owners' greater willingness to contribute to beach protection reflecting their vested interests in their beach community properties. Third, much stronger models were found in both data sets for the annual beach protection fund as opposed to the daily user fee payment vehicles. Responses to the annual fund question are more explainable in terms of

reasonable predictor variables than the responses to the daily fee questions. Finally, stronger regression models were found using the on-site data compared to the mail survey data, especially for the annual beach protection fund payment vehicle. (Variance explained was 28% for on-site data vs. 16% for mail data.) This difference may reflect the more heterogeneous nature of the mail survey sample (which included non-beach users, as well as beach users from throughout the Mid-Atlantic region), as well as a possible methodological effect resulting from the mail questionnaire versus personal interview approach.

APPENDIX C

**OTHER REASONS NOT WILLING
TO PAY MORE FOR A WIDER BEACH--
ON-SITE RESPONDENTS**

**OTHER REASONS NOT WILLING TO PAY FOR WIDER BEACH--
ON-SITE RESPONDENTS**

	No. Responses
WOULD NOT LIKE A WIDER BEACH	
Wider beach isn't worth paying more for than unreplenished beach	37
Like to be close to water	20
Don't like beach too wide	18
Like small beach with natural sand	4
Don't like to walk too far	1
Total	80
WIDTH IS NOT IMPORTANT	
Wider beach no effect on enjoyment	61
Wideness not important	2
Total	63
BEACH IS OKAY AT CURRENT WIDTH	
Okay as is	35
Wide enough as is	2
Width okay now for density of people in survey photo	1
Total	38
WOULD NOT USE DELAWARE BEACHES IF HAVE USER FEE	
Would go to different beach	22
Would do something else	6
Would stay in home state	2
Total	30
ALREADY PAY THROUGH OTHER MEANS	
Already pay through other means/with rentals	27
Contribute through other means	1
Total	28

**OTHER REASONS NOT WILLING TO PAY FOR WIDER BEACH--
ON-SITE RESPONDENTS**

	No. Responses
WIDER BEACHES CAUSE INCREASED CROWDING	
Increased width would bring more people	18
Sand replenishment would increase crowds	2
Don't want a crowded beach	1
Beaches will still be crowded	1
Total	22
GOVERNMENT SHOULD PAY FOR WIDER BEACH	
State and federal government should support replenishment	9
Responsibility of state and towns	4
Towns should support sand replenishment	2
County should support sand replenishment	1
Total	16
AGAINST USER FEES	
Against daily user fees	7
Object to method of payment	7
Paying for beach makes me mad	1
Property owners should not pay	1
Total	16
BEACHES SHOULD BE FREE	
Beach should be free	12
Free access for Delaware residents	2
Public resource should be free	1
Total	15

**OTHER REASONS NOT WILLING TO PAY FOR WIDER BEACH--
ON-SITE RESPONDENTS**

	No. Responses
SAND REPLENISHMENT IS NOT A GOOD IDEA	
Sand replenishment is bad idea/futile/no good alone	12
Sand replenishment not worth the cost	1
Rehoboth Beach will erode like Dewey Beach	1
Total	14
RATHER PAY THROUGH TAXES	
Should pay through taxes	9
Against beach fee, tax okay	1
Federal and state taxes should be used	1
Total	11
COULD NOT AFFORD TO PAY USER FEE	
Could not afford to visit	4
Retired on fixed income	2
On a limited income	1
Too many other expenses	1
Total	8
NEEDS MORE INFORMATION	
Not sure sand replenishment works	6
Needs additional information	1
Total	7
CROWDED BEACHES ARE OKAY	
Crowded beach is okay	1
Like being on beach with people	1
Total	2

**OTHER REASONS NOT WILLING TO PAY FOR WIDER BEACH--
ON-SITE RESPONDENTS**

	No. Responses
SHOULD NOT PAY FOR A WIDENED BEACH	
Should not pay for a widened beach	1
Should not pay for nature	1
Total	2
NATURE SHOULD CARE FOR BEACH	
Let nature care for beach	1
Nature will care for beach	1
Total	2
MISCELLANEOUS COMMENTS	
Not on beach often enough	4
Gentle slope is only concern	1
Surfing bad with sand replenishment	1
Likes using a wide beach	1
Number of users too small	1
Replenish to protect buildings and property	1
Total	9

APPENDIX D

**OTHER REASONS NOT WILLING
TO PAY MORE FOR A WIDER BEACH--
MAIL RESPONDENTS**

**OTHER REASONS NOT WILLING TO PAY FOR WIDER BEACH--
MAIL RESPONDENTS**

	No. Responses
NOT A FREQUENT DELAWARE BEACH USER	
Doesn't use beach often enough	18
Beach is not important to me	4
Lives out of state	2
Mainly visit beaches in other states	1
Lives too far away	1
Total	26
OPPOSED TO CONTRIBUTING TO A WIDER BEACH	
Beaches should be free	7
May go elsewhere if fee imposed	6
On fixed income; can't afford it	4
Fee would deter people from using Delaware beaches	3
Objects to per person user fee	1
Cost must be reasonable/accessible to all regardless of wealth	1
Might find alternate beach	1
Paying more would be burden on families	1
Total	24
BEACH WIDTH IS ADEQUATE	
Beach is wide enough	16
A wider beach wouldn't change a day at beach	2
User fee should be to maintain beach, not widen it	2
Total	20
ALREADY PAY TO USE THE BEACH	
Already pay through other means	15
Pay through taxes	1
Spends enough money at beach (hotel, food, gas, etc.)	1
Total	17

**OTHER REASONS NOT WILLING TO PAY FOR WIDER BEACH--
MAIL RESPONDENTS**

	No. Responses
NOT SURE SAND REPLENISHMENT WORKS	
Replenishment doesn't work	6
Not sure it works	6
Adding sand is not the answer; protect the dunes	2
Look at other means	1
There will always be a beach; the question is where	1
Total	16
DELAWARE RESIDENTS AND PROPERTY OWNERS SHOULD NOT HAVE TO PAY	
Owens beach property	6
We are residents; shouldn't have to pay	6
Property owners should not have to pay	2
Total	14
PROPOSED OPTIONS FOR SUPPORTING BEACH REPLENISHMENT	
Federal, state, and local governments should pay	6
Government and user fee should be enough money	2
Responsibility lies with landowner (private and commercial)	2
Merchants should pay	1
Let users pay	1
Total	12
EROSION WILL OCCUR NATURALLY	
Let nature take its course	6
Erosion is natural process	4
Replenishment is eventually a losing battle	2
Total	12

**OTHER REASONS NOT WILLING TO PAY FOR WIDER BEACH--
MAIL RESPONDENTS**

	No. Responses
WIDE BEACH ATTRACTS MORE PEOPLE	
More sand means more people	2
Would be willing to pay as last resort	1
Total	4
WOULD BE WILLING TO CONTRIBUTE MORE FOR REPLENISHED BEACH	
Willing to pay to protect beach, wildlife, natural beach	3
Would be willing to pay as last resort	1
Total	4
BEACH WOULD BE TOO WIDE	
Beach too wide	1
Beach would lose its appeal	1
Beach would seem barren if too wide	1
Total	3
MISCELLANEOUS	
Feels previous amount for unnourished beach is adequate	35
Need more information	6
Doesn't like coarseness of sand	1
Not cost-effective in long run, would have to be done too often	1
Assume replenishment will happen no matter who pays	1
Doesn't like quality of water; strong undertow	1
Sand replenishment would create more commercialism, increase costs, and place more control requirements that escalate on the public	1
Thinks money would go elsewhere (boardwalk, vendors, hotels) instead of beach replenishment	1
Total	47

APPENDIX E

**OTHER REASONS NOT WILLING
TO CONTRIBUTE TO AN ANNUAL BEACH FUND--
ON-SITE RESPONDENTS**

**OTHER REASONS FOR NOT CONTRIBUTING TO ANNUAL BEACH FUND--
ON-SITE RESPONDENTS**

	No. Responses
LIVE OUT OF STATE	
Not a resident of Delaware	10
Contributes to New Jersey beaches	1
Total	11
SHOULD HAVE USER FEE OR ANNUAL CONTRIBUTION, NOT BOTH	
Either user fee or annual contribution	8
Would contribute annually if no user fee	1
Total	9
GOVERNMENT SHOULD BE RESPONSIBLE	
Responsibility of state and towns	4
Government should pay through taxes	1
Federal government should pay for disasters	1
Total	6
SAND REPLENISHMENT IS A BAD IDEA	
Total	3
WOULD NOT USE DELAWARE BEACHES IF HAD TO PAY	
Would go to different beach	2
Would do something else	1
Total	3
MISCELLANEOUS COMMENTS	
Against beach fees	1
Nature will take care of beach	1
Not on beach often enough	1
On a limited income	1
Contributing to other funds is more important	1
Would contribute to all East Coast beaches	1
Would contribute if owned property	1
Total	7

APPENDIX F

**OTHER REASONS NOT WILLING TO CONTRIBUTE
TO AN ANNUAL BEACH FUND--
MAIL RESPONDENTS**

**OTHER REASONS FOR NOT CONTRIBUTING
TO AN ANNUAL BEACH FUND--
MAIL RESPONDENTS**

	No. Responses
NOT A FREQUENT DELAWARE BEACH USER	
Live out of state, would support that state	8
Doesn't use beach often enough	8
Lives too far away	1
Total	17
PROPOSED OPTIONS FOR CONTRIBUTING TO ANNUAL BEACH FUND	
Users and businesses who benefit should pay	4
Taxes should pay for replenishment	3
If there were user fee would not pay annual contribution	3
Prefer annual contribution rather than user fee	1
Would pay if non-fishing vehicles were banned from beach	1
Non-Delawarean--would be willing to pay more for user fee than Delaware resident	1
Total	13
NOT SURE SAND REPLENISHMENT WORKS	
Not sure it works	9
Total	9
OPPOSED TO CONTRIBUTING TO ANNUAL BEACH FUND	
Limited income; can't afford it	2
Would not contribute just to protect beaches, have to serve meaningful purpose	1
Not sure who should pay and how much it's worth	1
Objects to idea of paying for beach	1
Not sure how much beach is worth	1
Total	6
NOT INTERESTED; THERE ARE MORE IMPORTANT THINGS TO SPEND MONEY ON	
Not interested; more important things to spend money on	5
Total	5

**OTHER REASONS FOR NOT CONTRIBUTING
TO AN ANNUAL BEACH FUND--
MAIL RESPONDENTS**

	No. Responses
MISCELLANEOUS	
Beach erosion is natural process	3
Survey sounds like a market study	1
Restrict development; this is what causes erosion	1
Age--getting too old to contribute to fund	1
Total	6

APPENDIX G

OPEN-ENDED COMMENTS--

ON-SITE RESPONDENTS

OPEN-ENDED COMMENTS--ON-SITE RESPONDENTS

	No. Responses
POSITIVE COMMENTS ABOUT DELAWARE BEACHES	
Enjoy coming to Delaware beaches	14
Delaware beaches are better than Maryland's and New Jersey's	4
Enjoy relaxed family atmosphere	4
Delaware beaches are fantastic	2
Lifeguards are good	2
Enjoys South Bethany because it's not crowded	1
Likes Fenwick Island because no tall buildings	1
Total	28
BEACH MANAGEMENT SUGGESTIONS	
Erosion needs to be addressed	3
Everyone should help with beach management	3
Replenish, but no pipes or cranes	1
Beachfront zoning should be stronger	1
Solicit public support by holding public meetings	1
Replace sand only for ecological reasons	1
Only contribute to beaches needing sand replenishment	1
Treat all beaches like state parks	1
Dunes have no effect	1
Bayfront bulkheading is good	1
Dunes should be maintained also	1
Improve management of beachfront lots	1
Responsibility of state and town to replenish	1
Sand replenishment is state responsibility first	1
Need to keep beaches cleaner	1
South Bethany beaches are negatively affected by buildings	1
Management has no effect	1
Delaware should restrict development along beach	1

OPEN-ENDED COMMENTS--ON-SITE RESPONDENTS

	No. Responses
Need more public rest rooms	1
South Bethany needs concessions and beach rentals	1
Total	24
AGAINST USER FEES	
Philosophically against user fees	8
Against user fees	6
Offended by beach user fees in New Jersey	1
Beach user fees are a rip-off	1
User fees will deter tourism	1
Paying for beach makes me mad	1
Will not return if user fee imposed	1
Total	19
SAND REPLENISHMENT IS NOT A GOOD IDEA	
Sand replenishment alone is no good	5
Sand replenishment is a bad idea	2
Sand replenishment is futile	2
Federal government should stay out of sand replenishment	1
Sand replenishment should be studied more	1
Total	11
SUGGESTED ALTERNATIVES TO DAILY USER FEES	
Include beach user fee within other existing costs	2
Impose \$5 user fee for tourist rentals	1
Don't charge businesses or property owners	1
User fee for adults only, not kids	1
User fee on all Delaware beaches is not justified	1
Should have a group rate user fee	1
User fee okay if additional public facilities are provided	1

OPEN-ENDED COMMENTS--ON-SITE RESPONDENTS

	No. Responses
Yearly family fee is okay	1
Total	9
SHOULD HAVE EITHER USER FEE OR ANNUAL CONTRIBUTION	
Would contribute larger annual if no user fee	4
Would contribute annually only if no user fee	2
Wouldn't make annual contribution if user fee imposed	1
Would rather donate annual and reduce user fee	1
User fee should be implemented	1
Total	8
PAY THROUGH TAXES	
Should pay through taxes	5
Already pay a tax for beach replenishment	1
Delaware should have a sales tax for sand replenishment	1
Rather pay through increased taxes	1
Total	8
NEEDS MORE INFORMATION	
Wants information on sand replenishment in Delaware	3
Needs more information before contributing	1
Not enough information for all the questions	1
Total	5
NATURE SHOULD CARE FOR BEACH	
Nature will care for beach	4
Total	4
SURVEY METHOD SUGGESTIONS	
Greatly value beach, but survey didn't reflect his true feelings	1
Survey should have asked if own property or not	1
Some survey questions did not fit this beach	1
Total	3

OPEN-ENDED COMMENTS--ON-SITE RESPONDENTS

	No. Responses
BEACHES SHOULD BE FREE	
Total	2
WIDER BEACHES CAUSE INCREASED CROWDING	
Widening made beaches more crowded in Ocean City, Maryland	1
Width would bring more people	1
Total	2
LIKES USING A WIDE BEACH	
Total	2
SUGGESTED ALTERNATIVES TO SAND REPLENISHMENT	
Examine use of offshore reefs	1
Delaware should restrict development along beach	1
Total	2
WOULD DO SOMETHING DIFFERENT	
User fee could make us go to different beach	1
Would go to a different beach if user fee imposed	1
Total	2
ALREADY PAY THROUGH OTHER MEANS	
Already contribute with development recreation fee	1
Total	1
MISCELLANEOUS COMMENTS	
Depends on financial condition of South Bethany whether I'd contribute	1
Just come to beach to enjoy	1
No way to have a secure beach at South Bethany	1
Have a house at beach	1
Beach okay as is	1
Bethany Beach should be as wide as Ocean City, Maryland	1
New Jersey beaches are too wide	1
Owens condo in area; spends two months here	1

OPEN-ENDED COMMENTS--ON-SITE RESPONDENTS

	No. Responses
Owens property at beach	1
Would contribute if owned property at beach	1
Would contribute to all East Coast beaches	1
Beach replenishment hindered enjoyment in Ocean City, Maryland	1
We are business owners in Bethany Beach	1
Would volunteer to clean up beaches	1
Too far to get to water on New Jersey beaches	1
Tourism depends on wide beaches	1
Only locals would support beach nourishment	1
Delaware should advertise water quality	1
Sand replenishment ruins surfing	1
Would donate money to Maryland, not to Delaware	1
Total	20

APPENDIX H

OPEN-ENDED COMMENTS--

MAIL RESPONDENTS

OPEN-ENDED COMMENTS--MAIL RESPONDENTS

	No. Responses
FUNDS OR FEES SHOULD BE ASSESSED FOR BEACH REPLENISHMENT	
Would pay annual or weekly fee for use of beach (not daily)	23
If replenishment is done, should be paid for by state, county, or town taxes	21
Those who use/benefit the most should pay (owners, merchants)	19
Day trippers/out-of-staters can pay	14
Would pay family user fee, not per person	4
Support sales tax for all users	3
Would pay user fee if beach was nice	3
Doesn't use beach often, but would pay for upkeep	3
Would not pay annual contribution if there was a daily user fee	2
Would pay annually for beach protection	2
Willing to pay for replenishment based on real-estate taxes	1
Would only pay if no other options	1
Public beaches; let public pay	1
State and federal government should pay since revenue brought in by tourism	1
Owners renting property should get charged and direct money to beach preservation	1
Additional federal funds should be made available	1
Renters should pay by week rather than daily (too difficult)	1
Would only pay for beach replenishment at state park like Cape Henlopen	1
Total	102
OPPOSED TO BEACH REPLENISHMENT	
Opposed to beach replenishment	18
Not sure replenishment works, look at other options (jetties, reefs, etc.)	14
Can't fight nature, erosion is natural process	13
Preserve beaches as natural resource-protect wildlife	10
Don't widen beaches just to support more people	4
Not familiar enough with beach replenishment	2
Replenish only when necessary	1

OPEN-ENDED COMMENTS--MAIL RESPONDENTS

	No. Responses
Personally, I like looking at ocean, not lots of sand	1
Total	63
FUNDS OR FEES SHOULD NOT BE ASSESSED FOR BEACH REPLENISHMENT	
Oppose beach fees	23
User fees might keep people away and take away others' income	8
Resents/opposed to/not sure about paying for replenishment	7
Locals/DE residents should be exempt from user fees	5
Beaches should be accessible to all (keep fee low, free)	4
Doesn't want tax money spent on beaches; make businesses and residents pay	4
Questions not appropriate for beach homeowners; owner objects to paying	3
Doesn't want DE beaches to be like NJ beaches	2
User fee could put burden on families visiting	2
User fee not indicator of public policy; look at other issues	1
Would not pay penny for beach replenishment to protect houses built where dunes used to be	1
User fees may not maintain beach to a higher level	1
Total	61
SUPPORT BEACH REPLENISHMENT OPTIONS	
Please replenish the beaches with sand (replenishment works)	14
Maintain and protect beaches	2
Beach should be maintained and replenished, but don't think it needs to be extremely wide	1
Hope there is a cost-effective way of controlling erosion	1
Total	18
MISCELLANEOUS COMMENTS	
Developers are destroying the beaches	12
General comments about survey design	11
Ban disturbing the dunes; dunes help	11
Keep beaches clean, well-maintained--bring in more people	7

OPEN-ENDED COMMENTS--MAIL RESPONDENTS

	No. Responses
We enjoy the beaches	6
Not familiar with DE beaches--lives out of state	5
All beaches have same problems; federal government needs to get involved	4
Abolish federal flood insurance/insurance too high	3
Doesn't use beach often	3
Develop plan to control growth and limit overcrowding	2
Parking is a problem at some beaches/allow permit parking only	2
Need more information	2
Why have zoning regulations been so lax to allow dunes to be destroyed?	1
No information on U of DE involvement in process or what Sea Grant means	1
No, I don't ever get to DE beaches	1
State gets revenues; towns get problems	1
Set up day care on beach	1
Don't think all DE beaches should be treated the same	1
Allow bulkheading for protection of oceanfront property	1
More advertising would bring in more people and more money	1
For increased revenue, should increase parking, license fees, etc.	1
Total	77

APPENDIX I

**ON-SITE SURVEY MATERIALS
AND MEAN FREQUENCY RESPONSES**

BEACH USER STUDY FIELD SURVEY INSTRUMENT

Number		Weather/Temp	
Date		Interviewer	
Location		Beach Density	
Time			

HI, I AM WITH THE UNIVERSITY OF DELAWARE, MARINE STUDIES COMPLEX, IN LEWES. TODAY WE ARE DOING SOME RESEARCH ON THE BEACH, AND I WOULD LIKE TO ASK YOU A FEW QUESTIONS. IT SHOULD ONLY TAKE ABOUT TEN MINUTES.

1. Where is your principal home residence? State (1) PA--28%, (2) MD--28%, (3) DE--16%; (4) VA--9% Zip Code _____

2. Are you visiting the beach today as part of a:

<u>8%</u> day visit to this beach community	<u>92%</u> overnight visit to this beach community	
	<u>1%</u> (a) weekend trip	
	<u>75%</u> (b) short vacation (<1 week)	
	<u>13%</u> (c) long vacation (>1 week)	
	<u>8%</u> (d) seasonal resident (June-August)	
	<u>2%</u> (e) other (Specify) <u>Live Year-Round; Live Seasonal</u>	

3. What year did you first visit a Delaware ocean beach? Year _____

4. How often have you visited Delaware's ocean beaches since this first visit?

<u>69%</u> every year	
<u>9%</u> every other year	
<u>8%</u> every 2-5 years	
<u>4%</u> less often than every 2-5 years	<u>10%--first visit</u>

5. How many days during the course of an average year do you spend on Delaware's ocean beaches?
Days $\bar{x} = 16.7$

6. What kind of transportation did you use to get to the beach today?

<u>43%</u> (a) car/van (How much will you pay for parking?) $\bar{x} = \$1.21$	
<u>1%</u> (b) park/ride bus (How much did you pay for the park/ride?) $\bar{x} = \$3.00$	
<u>1%</u> (c) bike	
<u>54%</u> (d) walk	
<u>1%</u> (e) other (specify) _____	

7. How many hours do you plan to spend on the beach during this particular outing? $\bar{x} = 4.7$ hours

8. Including yourself, how many people are with you at the beach today? $\bar{x} = 4.4$

9. I AM GOING TO READ SOME STATEMENTS ABOUT WHY YOU MIGHT CHOOSE TO VISIT THIS DELAWARE BEACH. PLEASE RATE YOUR LEVEL OF AGREEMENT OR DISAGREEMENT WITH EACH STATEMENT I READ USING THE SCALE ON THE CARD. (1 = STRONGLY DISAGREE, 2 = DISAGREE, 3 = UNDECIDED; 4 = AGREE; 5 = STRONGLY AGREE)

	SD	D	U	A	SA	\bar{x} 's
I come to the beach to be with a large number of people.	1	2	3	4	5	2.2
.....for solitude (to be alone).	1	2	3	4	5	2.8

.....to socialize with family, friends, and others.	1	2	3	4	5	4.1
.....to enjoy the visual qualities of the beach scenery.	1	2	3	4	5	4.4
I come to this beach to engage in beach-related activities (swim, surf, etc.)	1	2	3	4	5	4.4
.....because it is close to my home or where I am staying.	1	2	3	4	5	4.2
.....because there is little or no cost to enjoy it.	1	2	3	4	5	3.9
.....because there is adequate parking.	1	2	3	4	5	3.0
.....because there are adequate concessions and rentals.	1	2	3	4	5	3.2
.....because it has public rest room facilities.	1	2	3	4	5	2.7
.....because it is wide enough to enjoy my activities.	1	2	3	4	5	3.9
.....because the town keeps the beach clean and attractive.	1	2	3	4	5	4.3

NOW I AM GOING TO READ A FEW STATEMENTS ABOUT BEACH MANAGEMENT AND SAND REPLENISHMENT. AGAIN, RATE YOUR LEVEL OF AGREEMENT OR DISAGREEMENT WITH EACH STATEMENT.

	SD	D	U	A	SA	\bar{x} 's
Jetties, groins, and bulkheads are effective at slowing erosion.	1	2	3	4	5	3.4
Sand replenishment should be used to maintain wide beaches.	1	2	3	4	5	3.8
A wide, sandy beach will protect beachfront property and preserve the coastal economy.	1	2	3	4	5	3.9
If I know the beaches are kept replenished with sand, it would give a sense of security to my family and me.	1	2	3	4	5	3.5
The federal government should help support sand replenishment of Delaware's public beaches.	1	2	3	4	5	3.4
State government should help support sand replenishment of Delaware's public beaches.	1	2	3	4	5	4.1
Local government (e.g., the county and coastal towns) should help support sand replenishment of Delaware's public beaches.	1	2	3	4	5	4.1
Everyone who uses or benefits from the beach should help support beach replenishment efforts.	1	2	3	4	5	3.8
10. On a scale of 1-10 (with 10 being perfect), how would you rate the quality of your beach experience today? $\bar{x} = 8.4$						
11. Using the crowding scale (refer to card), how would you describe the conditions on the beach today? 1--not at all crowded; 9--extremely crowded $\bar{x} = 4.7$						
12. Using the enjoyment scale (refer to card), how has the number of people impacted your enjoyment of the beach today? 1--increased my enjoyment; 9--reduced my enjoyment $\bar{x} = 4.5$						

13. NEXT, I WOULD LIKE TO ASK YOU A QUESTION TO HELP US MEASURE THE VALUE SOCIETY PLACES ON THE BEACH. THIS BEACH IS A NATURAL RESOURCE AVAILABLE FOR PUBLIC USE. SINCE THE BEACH IS FREE, THE ONLY WAY WE CAN MEASURE THE VALUE OF THIS PUBLIC BEACH IS TO ESTIMATE IT BY ASKING YOUR WILLINGNESS TO PAY FOR A DAY ON THE BEACH. I DON'T MEAN THAT YOU WOULD REALLY PAY FOR THE BEACH, BUT RATHER, I AM JUST USING THIS FIGURE TO ESTIMATE ITS VALUE.

Would you be willing to pay a per person user fee of (___ \$1, ___ \$2, ___ \$3, ___ \$4, ___ \$5) to use this beach today? 56% Yes; 44% No

What is the maximum you would be willing to pay to use this beach today? \$ \bar{x} = \$3.01 (max. (0's included)

14. If zero (0), which of these reasons best describes why you answered the way that you did?

- 3% a. not enough information
- 9% b. do not want to place a dollar value
- 1% c. object to the way that the question was presented
- 2% d. the figure I gave is what I feel it is worth
- 61% e. already pay through other means
- 13% f. object to method of payment (daily per person user fee)
- 12% g. other (specify) Should be free; would go elsewhere.

15. (ASK ONLY IF A MONETARY VALUE WAS GIVEN IN QUESTION 13.)

If a user fee in the amount you indicated was charged, how would that affect the number of visits you typically make to the beach?

- more than now. If more, how many more visits? _____
- 76% same as now.
- 24% fewer than now. If fewer, how many fewer visits? _____

16. A MAJOR PART OF THIS STUDY IS TO DETERMINE THE IMPORTANCE OF WIDE BEACHES TO YOU.

Please refer to these two photographs showing two beaches--one without sand replenishment (Photo A) and one with sand replenishment (Photo B). Would you be willing to pay more than the maximum amount previously mentioned (\$___) if the beach you are now using was widened like in Photo B?

30% Yes. If yes, what would you be willing to pay to use the wider beach?
 \bar{x} = \$3.70 (maximum) (0's included)

70% No. If no, why not? Specify. Already pay through other means; beach okay as is; width not important; would go elsewhere.

17. (ASK IF MONETARY VALUE IN #16 IS GREATER THAN 0.)

If a user fee in the amount you indicated was charged for using the wider ocean beach, how would that affect the number of visits you typically make to the beach?

- 1% more than now. If more, how many more visits? _____
- 68% same as now.
- 31% fewer than now. If fewer, how many fewer visits. _____

18. Which letter on the card best describes your present occupational status? (Refer to card.)

- 65% a. employed full time
- 11% b. employed part time
- 2% c. not employed
- 8% d. retired
- 9% e. full-time homemaker
- 6% f. student
- 1% g. other (specify) _____

19. What is your marital status? 74% Married; 26% Single

20. Record sex. 43% Male; 57% Female

21. (Refer to card.) Which letter on the card best describes your total annual family income?

- a. 4% under \$10,000
- b. 3% \$10,000-19,999
- c. 6% \$20,000-29,999
- d. 12% \$30,000-39,999
- e. 13% \$40,000-49,999
- f. 30% \$50,000-74,999
- g. 18% \$ 75,000-99,999
- h. 14% \$100,000 and above

22. What letter on the card best describes the last grade of regular school that you completed?

- a. -- no school
- b. <1% grade school (1-8)
- c. 2% some high school (9-11)
- d. 17% high school graduate (12)
- e. 22% some college (13-15)
- f. 31% college graduate (16)
- g. 28% post graduate (17+)
- h. -- no response/refused

23. Ask only if not obvious. How would you describe your racial or ethnic background?

97% White or Caucasian; 2% Black or Negro; 1% Other (specify) American Indian; Asian

24. (Refer to card.) Here is a list of age categories. Would you call off the code number of the category that contains your age?

10-19.....01-- <u>3%</u>	50-59.....05-- <u>11%</u>
20-29.....02-- <u>15%</u>	60-69.....06-- <u>7%</u>
30-39.....03-- <u>30%</u>	70+.....07-- <u>3%</u>
40-49.....04-- <u>31%</u>	Refused...08-- <u> </u>

25. Imagine there was a fund established for coastal beach protection against erosion for the sole purpose of protecting Delaware beaches. If you were to make a voluntary once-a-year donation to this fund, even if you did not use the beach, what would be the **MAXIMUM** yearly amount that you would be willing to contribute? This fund would ensure that the beaches would be available for your use, as well as future generations. Keep in mind that this contribution would be in addition to any daily user fees that you might pay. \$ X = \$63.69 (0's included)

26. If zero (0), which of these reasons best describes why you answered the way that you did?

- 11% a. not enough information
- 3% b. do not want to place a dollar value
- 4% c. object to the way question was presented
- 1% d. that is what it is worth
- 34% e. already pay through other means
- 8% f. object to method of payment (annual amount)
- 40% g. other (specify) Would pay annually or daily, not both; not a Delaware resident. (See Appendix.)

27. To help in the design of future questionnaires and in assessing the quality of our data for this study, would you answer the following question? Overall, how understandable did you find the wording of the questions I have asked?

Very clear...2 62%; Clear...1 34%; Moderate...0 3%; Unclear...-1 1%; Very unclear...-2

DO YOU HAVE ANY OTHER COMMENTS OR SUGGESTIONS YOU WOULD LIKE TO MAKE REGARDING DELAWARE'S OCEAN BEACHES?

SEE APPENDIX.

PHOTO A—OCEAN BEACH WITHOUT SAND REPLENISHMENT

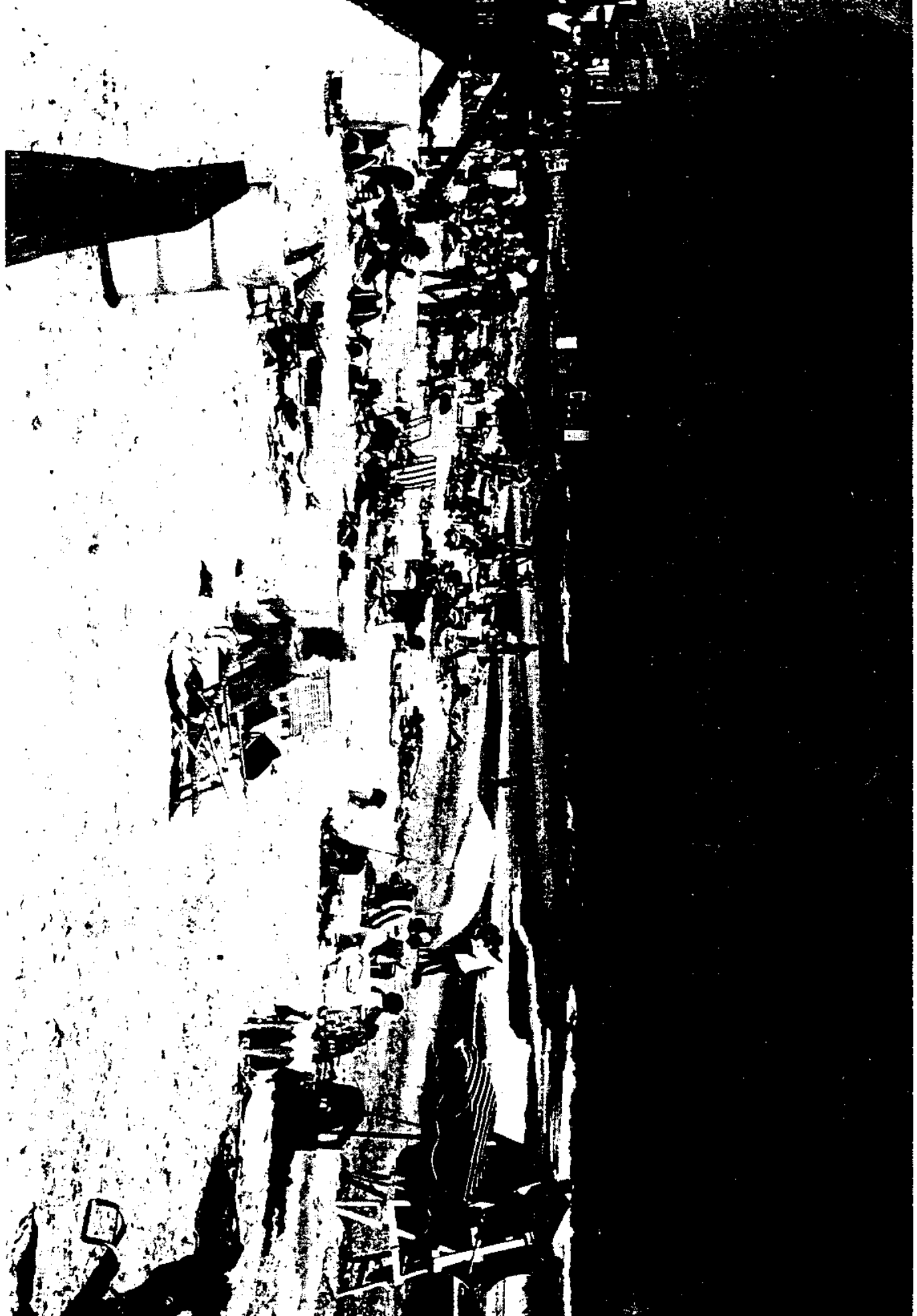
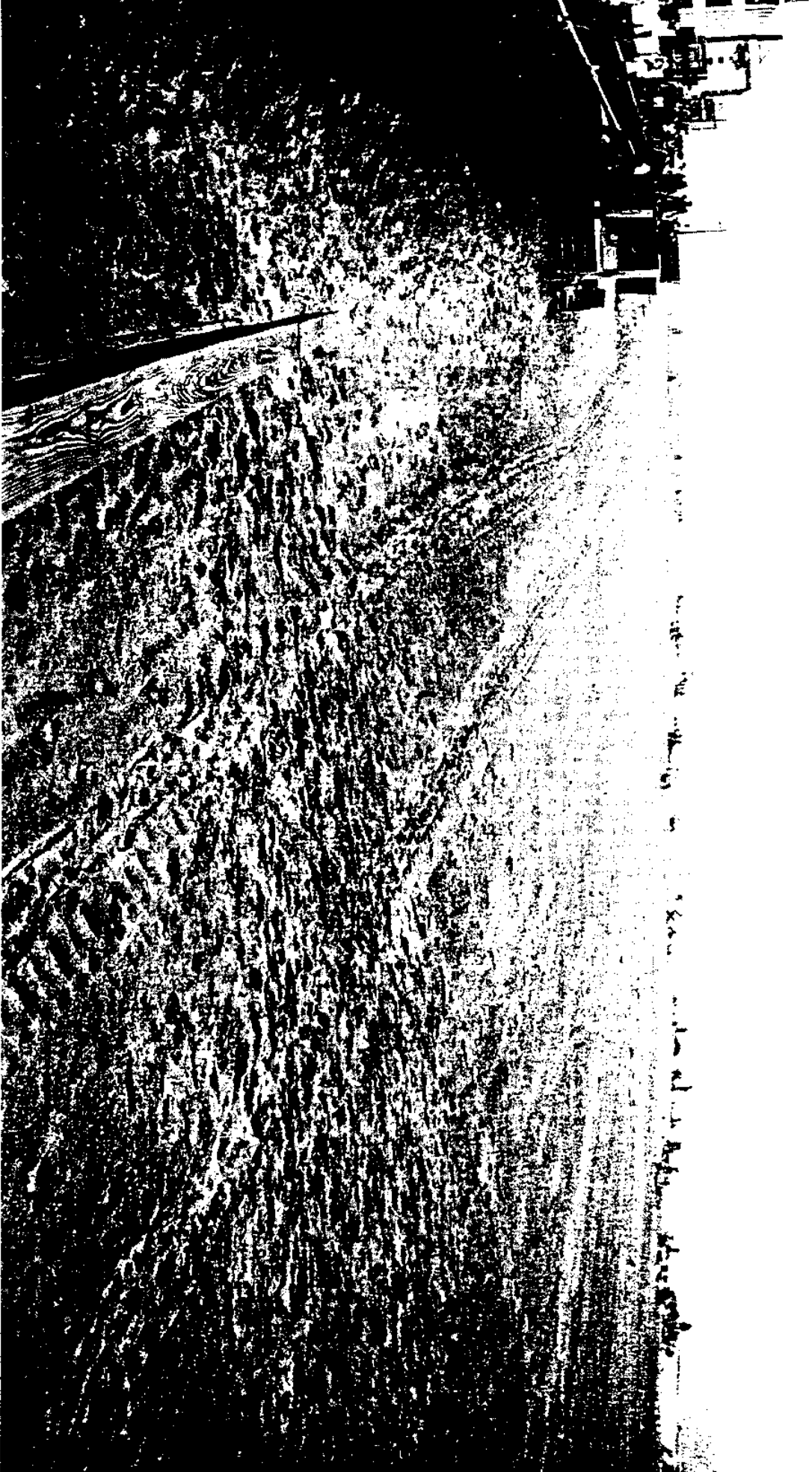


PHOTO B--OCEAN BEACH WITH SAND
REPLENISHMENT



APPENDIX J

**MAIL SURVEY MATERIALS
AND MEAN FREQUENCY RESPONSES**



DELAWARE BEACH STUDY 1993

1. Have you ever visited an ocean beach in Delaware?

86% Yes

14% No



Your responses to this survey are still important. Please go to Question 7.

2. When was your last visit to an ocean beach in Delaware? _____ (Year)

3. Please list the number of days during an average year that you spend on each of the following Delaware ocean beaches?

		\bar{x} Days	\bar{x} Days	% Who Visited	\bar{x} Days
% Who Visited:	<u>13</u> Cape Henlopen State Park (Lewes)	<u>6.0</u>	<u>12</u>	<u>South Bethany</u>	<u>33.2</u>
	<u>35</u> Rehoboth Beach	<u>27.7</u>	<u>5</u>	<u>Fenwick Island State Park</u>	<u>17.1</u>
	<u>18</u> Dewey Beach	<u>34.6</u>	<u>14</u>	<u>Fenwick Island</u>	<u>37.1</u>
	<u>10</u> Del. Seashore State Park Beaches	<u>9.4</u>	<u>2</u>	<u>Other Delaware Ocean Beaches</u>	<u>13.0</u>
	<u>22</u> Bethany Beach	<u>29.5</u>			
			(specify) <u>Indian Beach; North Shores</u>		

Total Number of Daily Visits in an Average Year _____

4. On the average, including yourself, how many people typically go to the beach with you? $\bar{x} =$ 3.3

5. Do you own residential property in a Delaware ocean beach community?

50% Yes

50% No

If yes, is it a 19% primary residence or 81% second home?

Do you make it available for seasonal or off-season rentals? 23% Yes 77% No

6. **WHEN DECIDING TO VISIT THE DELAWARE OCEAN BEACH YOU USE MOST OFTEN (REFER TO QUESTION No. 3), SEVERAL FACTORS MAY BE OF IMPORTANCE TO YOU. BELOW ARE A LIST OF FACTORS THAT YOU MIGHT CONSIDER WHEN CHOOSING THIS BEACH. PLEASE INDICATE YOUR LEVEL OF AGREEMENT OR DISAGREEMENT TO SHOW THE ROLE EACH FACTOR PLAYS IN YOUR DECISION TO VISIT YOUR FAVORITE DELAWARE OCEAN BEACH.**

I CHOOSE THIS BEACH:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	\bar{x} 's
to be with a large number of people	1	2	3	4	5	1.8
to enjoy solitude (to be alone)	1	2	3	4	5	3.5
to socialize with family, friends, and others	1	2	3	4	5	4.2
to enjoy the visual qualities of the beach scenery.	1	2	3	4	5	4.4
to engage in beach-related activities (swim, surf, etc.).	1	2	3	4	5	4.1
because it is close to my primary residence	1	2	3	4	5	3.1
because it is close to where I stay on my vacation	1	2	3	4	5	3.3
because there is little or no cost to enjoy it.	1	2	3	4	5	3.3

9B. If you answered zero or did not state a monetary value to Question 8, choose the statement below that best describes your reasons.

- 9% Not enough information.
- 4% Did not want to place a dollar value.
- 6% Objected to the way that the question was presented.
- 2% That is what it is worth.
- 46% Already pay through other means.
- 15% Objected to method of payment (daily per person user fee).
- 18% Other (specify): _____

SINCE THIS SURVEY IS PART OF A LARGER FEASIBILITY STUDY TO ASSESS THE COSTS AND BENEFITS ASSOCIATED WITH SAND REPLENISHMENT OF DELAWARE'S OCEAN BEACHES, IT IS VITAL TO DETERMINE HOW IMPORTANT WIDER BEACHES ARE TO YOU.

10. Please refer to the enclosed xeroxed photographs showing two beaches—one without sand replenishment (*Photo A*), and one with sand replenishment (*Photo B*). Would you be willing to pay **more** than the maximum amount you previously mentioned in Question 8 if Delaware's beaches were widened like the beach in Photo B?

- 21% Yes. If yes, what would be the maximum amount that you would be willing to pay to use the wider beach?
\$ $\bar{x}=\$3.50$ maximum. (Please answer Question 11.) (0's included)
- 79% No. If no, why not? (Please specify.) _____

IF YOU DID NOT PLACE A DOLLAR VALUE IN QUESTION 10, PLEASE GO TO QUESTION 12.

11. If a user fee in the amount you indicated in Question 10 was charged for using the wider ocean beach, how would that affect the number of visits you typically make to Delaware's ocean beaches?

- 11% More than now. If more, how many more visits would you make? _____
- 77% Same as now.
- 12% Fewer than now. If fewer, how many fewer visits would you make? _____

**THE FOLLOWING INFORMATION WILL HELP OUR RESEARCH STAFF
ANALYZE THE RESULTS OF THE STUDY PROPERLY.**

12. Which best describes your present occupational status?

- | | |
|---------------------------------|-------------------------------|
| <u>58%</u> Employed full-time | <u>27%</u> Retired |
| <u>4%</u> Employed part-time | <u>4%</u> Full-time homemaker |
| <u>< 1%</u> Not employed | <u>2%</u> Student |
| <u>4%</u> Other (specify) _____ | |

13. What is your marital status? 75% Married 25% Single

14. What is your sex? 34% Female 66% Male

15. Which best describes your total annual family income, before taxes?

- | | |
|------------------------------|------------------------------|
| <u>3%</u> Under \$10,000 | <u>12%</u> \$40,000 – 49,999 |
| <u>4%</u> \$10,000 – 19,999 | <u>18%</u> \$50,000 – 74,999 |
| <u>6%</u> \$20,000 – 29,999 | <u>14%</u> \$75,000 – 99,999 |
| <u>12%</u> \$30,000 – 39,999 | <u>32%</u> \$100,000 & above |

16. Which best describes the last grade of regular school that you completed?

- | | |
|--------------------------------------|-----------------------------------|
| <u>--</u> No School | <u>16%</u> Some College (13 – 15) |
| <u>--</u> Grade School (1 – 8) | <u>25%</u> College Graduate (16) |
| <u>2%</u> Some High School (9 – 11) | <u>44%</u> Post Graduate (17+) |
| <u>13%</u> High School Graduate (12) | |

17. How would you describe your racial or ethnic background?

96% White or Caucasian
<1% Black or Negro
4% Other (specify) American Indian; Asian; Egyptian

18. Which best describes your age group?

1% 10 - 19 22% 50 - 59
3% 20 - 29 16% 60 - 69
17% 30 - 39 19% 70 +
23% 40 - 49

19. To help in the design of future questionnaires and in assessing the quality of our data for this study, overall how did you find the wording and understanding of the questions we have asked?

32% Very Clear 3% Unclear
46% Clear 1% Very Unclear
19% Moderate

FINALLY, IT MAY BE WORTH SOMETHING TO YOU TO HAVE DELAWARE'S OCEAN BEACHES REPLENISHED WITH SAND FOR YOUR FUTURE USE, EVEN THOUGH YOU DO NOT INTEND TO USE THEM NOW. IT MAY ALSO BE WORTH SOMETHING TO YOU TO SIMPLY KNOW THE OCEAN BEACHES ARE MAINTAINED FOR FUTURE GENERATIONS AND OTHERS EVEN THOUGH YOU WILL NEVER USE THEM.

20. Imagine there was a fund established for coastal beach protection against erosion for the sole purpose of protecting Delaware beaches. If you were to make a voluntary once-a-year contribution to this fund, even if you did not use the beach, what would be the maximum yearly amount that you would be willing to put toward beach protection to ensure it is available for your use and the use of others?

\$ $\bar{x} = 26.60$ **Keep in mind this contribution would be in addition to any daily user fees that you might pay.**
(0's included)

21. If you answered zero, or did not state a monetary value to Question 20, choose the statement below that best describes your reasons. (If you placed a monetary value in Question 20, please skip this question.)

14% Not enough information.
14% Did not want to place a dollar value.
5% Objected to the way that the question was presented.
3% That is what it is worth.
32% Already pay through other means.
9% Objected to method of payment (annual amount).
24% Other (specify): See Appendix.

Do you have any other comments or suggestions you would like to make regarding Delaware's ocean beaches?

SEE APPENDIX.

THAT CONCLUDES THE SURVEY, THANK YOU FOR YOUR COOPERATION.

**PLEASE RETURN THE COMPLETED SURVEY FORM
IN THE STAMPED, SELF-ADDRESSED ENVELOPE PROVIDED.**



Photo A—Ocean beach without sand replenishment.

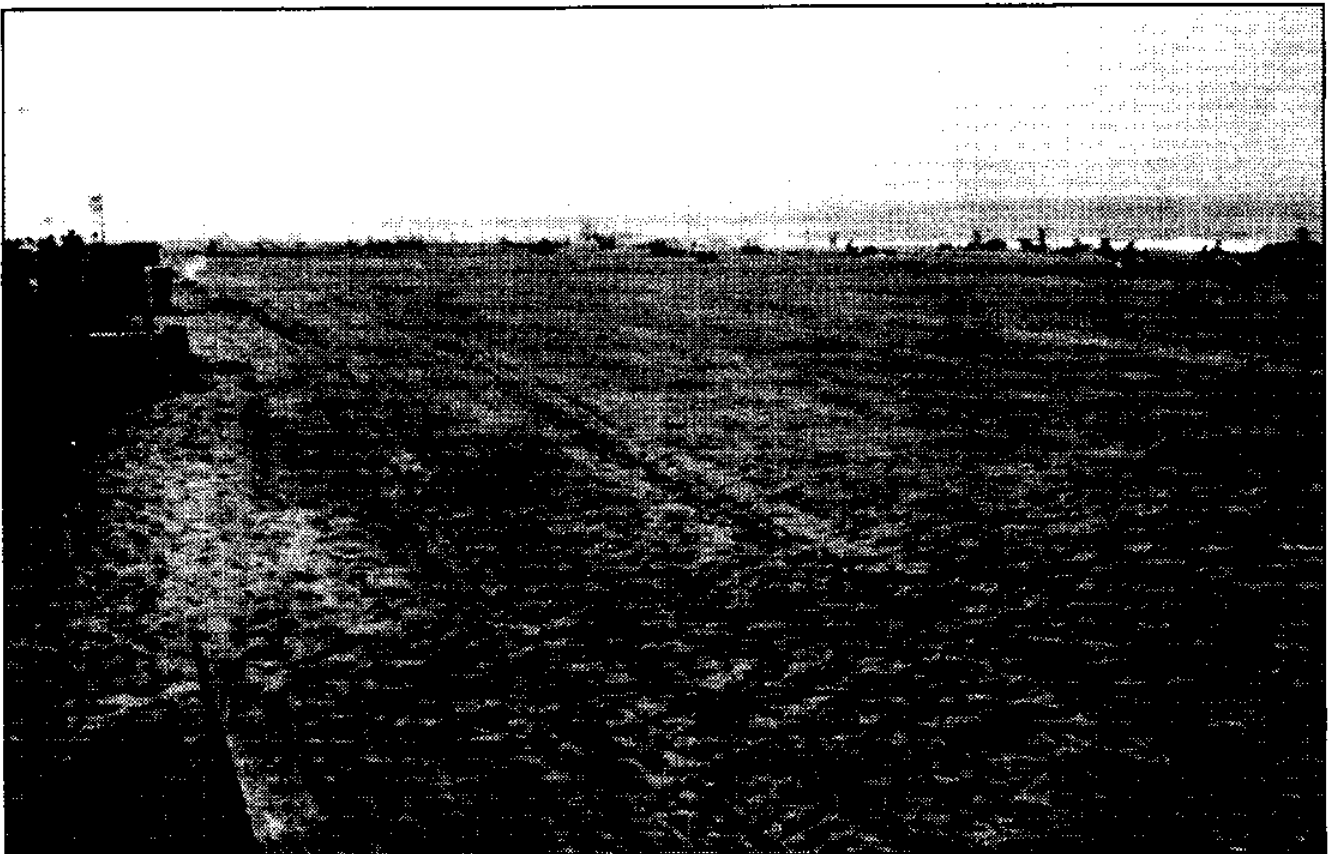


Photo B—Ocean beach with sand replenishment.



SEA GRANT
COLLEGE PROGRAM

University of Delaware
Lewes, Delaware 19958-1298
Ph: 302/645- 4235
Fax: 302/645-4007

Fall 1993

Dear Resident:

You have been randomly selected to participate in a study being conducted by the University of Delaware Sea Grant Program to determine people's attitudes about coastal beach protection. This survey is part of a larger feasibility study being initiated by the U.S. Army Corps of Engineers and the Beach Preservation Section of the Delaware Department of Natural Resources and Environmental Control. The objective of the study is to assess the costs and benefits associated with long-term sand nourishment of Delaware's ocean beaches.

Your participation is entirely voluntary, and you may refuse to answer any question. Because only a small number of people are being selected for the study, the participation of each person is extremely important. In completing the questionnaire, keep in mind that most of the questions have to do with your attitudes and opinions, and there are no right or wrong answers.

The information you provide will be kept strictly confidential and will be used only for overall statistical reports. The questionnaire should only take about ten minutes to complete.

When you have completed the survey, please mail it back in the postage-paid return envelope. Thank you for your help.

Sincerely,

A handwritten signature in cursive script that reads "J. M. Falk".

James M. Falk
Marine Advisory Specialist

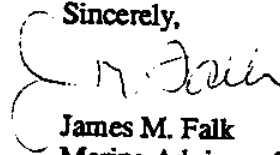
Dear Resident:

Last week a questionnaire seeking information on coastal beach protection in Delaware was mailed to you. If you have already completed and returned the questionnaire, please accept our sincere thanks. If not, please do so today.

We are seeking information from people in the region to determine attitudes about nourishing ocean beaches and their willingness to pay for such projects. If the results of the study are to accurately represent the views of the selected sample, it is extremely important that your responses be included.

Thanks again for your help and cooperation.

Sincerely,

A handwritten signature in cursive script, appearing to read "J. M. Falk", written in dark ink.

James M. Falk
Marine Advisory Specialist



SEA GRANT
COLLEGE PROGRAM

University of Delaware
Hugh R. Sharp Campus
Lewes, Delaware 19958-1298

Fall 1993

Dear Resident:

About three weeks ago you were sent a questionnaire which is part of a study to determine people's attitudes about coastal beach protection. If you have already returned it, we thank you for your prompt reply. If you have not completed the questionnaire, would you take the time to do so today? It should only take a few moments of your time.

The accuracy of the study depends on the number of questionnaires returned. The information you provide is important because it will help characterize attitudes and feelings of residents from the region on a variety of beach issues that must be addressed by resource managers in the future. Remember, all responses will be summarized and handled in strict confidentiality.

A questionnaire and postage-paid return envelope are enclosed in case you did not receive one or no longer have the first one we sent you.

Thank you again for your interest and cooperation.

Sincerely,

A handwritten signature in cursive script that reads 'J. M. Falk'.

James M. Falk
Marine Advisory Specialist

Enclosures



SEA GRANT
COLLEGE PROGRAM

University of Delaware
Hugh R. Sharp Campus
Lewes, Delaware 19958-1298

Fall 1993

Dear Resident:

Several weeks ago we sent you a questionnaire seeking your opinions and attitudes about coastal beach protection in Delaware. As of today, we have not received your completed questionnaire.

The large number of questionnaires returned is encouraging. But, whether we will be able to describe accurately how residents living in the region feel about issues related to beach protection and management depends upon you and the others who have not yet responded.

This is the first study of this type conducted on Delaware's ocean beaches. Therefore the results are particularly important to state and federal officials as well as both users and non-users of these important resources. The usefulness of our results depends on how accurately we are able to represent the viewpoints of residents from the entire mid-Atlantic region.

In case our original correspondence did not reach you or was misplaced, a replacement questionnaire and postage-paid envelope are enclosed. May we urge you to complete and return it to us as quickly as possible.

Thank you again for your contribution to the success of this study.

Sincerely,

James M. Falk
Marine Advisory Specialist

Enclosures